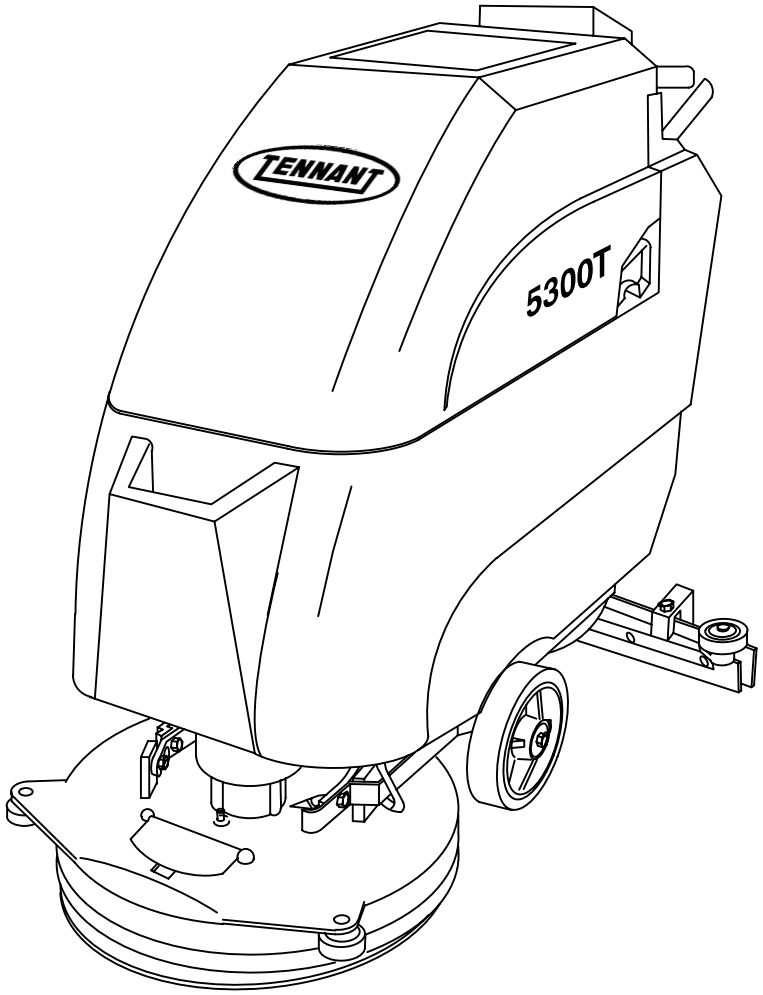
5300T

Service Manual



MM382
Rev. 00 (10–94)

This service manual is intended to be an aid for the disassembly and reassembly of your TENNANT Model 5300T.

The set is organized into four major groups: General Information, Chassis, Scrubbing, and Electrical.

General Information: Machine safety, transport, jacking, lifting, and storage. Machine specifications, Maintenance charts and Hardware information.

Chassis: Tire/wheel replacement, Parking brake adjustment and replacement, Caster replacement, Transaxle and Transaxle drive motor replacement.

Scrubbing: Squeegee assembly replace and adjust, Scrubber head replace and adjust, Scrubber brush motor replacement, Vacuum fan replacement, Solution/recovery tank replacement, , Power wand pump replacement, and Scrubbing troubleshooting chart.

Electrical: Battery maintenance and replacement, Charging instructions, Circuit breaker/relay replacement, Instrument panel replacement, Vacuum fan motor brush replacement, Scrub brush brush replacement, Electrical schematic, and Electrical troubleshooting.

Manual Number MM 382

Revision: 00

Published: 10–94

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SAFETY PRECAUTIONS

The following symbols are used throughout this manual as indicated in their description:

WARNING: To warn of hazards or unsafe practices which could result in severe personal injury or death.

FOR SAFETY: To identify actions which must be followed for safe operation of equipment.

The following information signals potentially dangerous conditions to the operator or equipment. Read this manual carefully. Know when these conditions can exist. Locate all safety devices on the machine. Then, take necessary steps to train machine operating personnel. Report machine damage or faulty operation immediately. Do not use the machine if it is not in proper operating condition.

FOR SAFETY:

1. **Do Not Operate Machine:**
   - **Unless Trained And Authorized.**
   - **Unless Operation Manual Is Read And Understood.**
   - **In Flammable Or Explosive Areas Unless Designed For Use In Those Areas.**

2. **Before Starting Machine:**
   - **Make Sure All Safety Devices Are In Place And Operate Properly.**
   - **Check Brakes And Steering For Proper Operation (If So Equipped).**

3. **When Using Machine:**
   - **Go Slow On Inclines And Slippery Surfaces.**
   - **Use Care When Backing Machine.**

4. **Before Leaving Or Servicing Machine:**
   - **Stop On Level Surface.**
   - **Turn Off Machine And Remove Key.**

5. **When Servicing Machine:**
   - **Avoid Moving Parts. Do Not Wear Loose Jackets, Shirts, Or Sleeves When Working On Machine.**
   - **Block Machine Tires Before Jacking Machine Up.**
   - **Jack Machine Up At Designated Locations Only. Block Machine Up With Jack Stands.**
   - **Use Hoist Or Jack Of Adequate Capacity To Lift Machine.**
   - **Wear Eye And Ear Protection When Using Pressurized Air Or Water.**
   - **Disconnect Battery Connections Before Working On Machine.**
   - **Avoid Contact With Battery Acid.**
   - **Use TENNANT Supplied Or Equivalent Replacement Parts.**

WARNING: Batteries Emit Hydrogen Gas. Explosion Or Fire Can Result. Keep Sparks And Open Flame Away. Keep Covers Open When Charging.

WARNING: Flammable Materials Can Cause An Explosion Or Fire. Do Not Use Flammable Materials In Tank(s).

WARNING: Flammable Materials Or Reactive Metals Can Cause Explosion Or Fire. Do Not Pick Up.

ATTENTION: The battery charger supplied with the machine shall be grounded while in use to protect the operator from electrical shock. This charger is designed for use on a nominal 120 volt circuit and has a grounded plug. Make sure the charger is connected to an outlet having the same configuration. No adapter should be used with this charger. The green conductor in the cord is the ground wire. Never connect this wire to other than the grounding pin of the attachment plug.

ATTENTION: Failure of components due to lack of freeze protection voids the warranty on such componants.

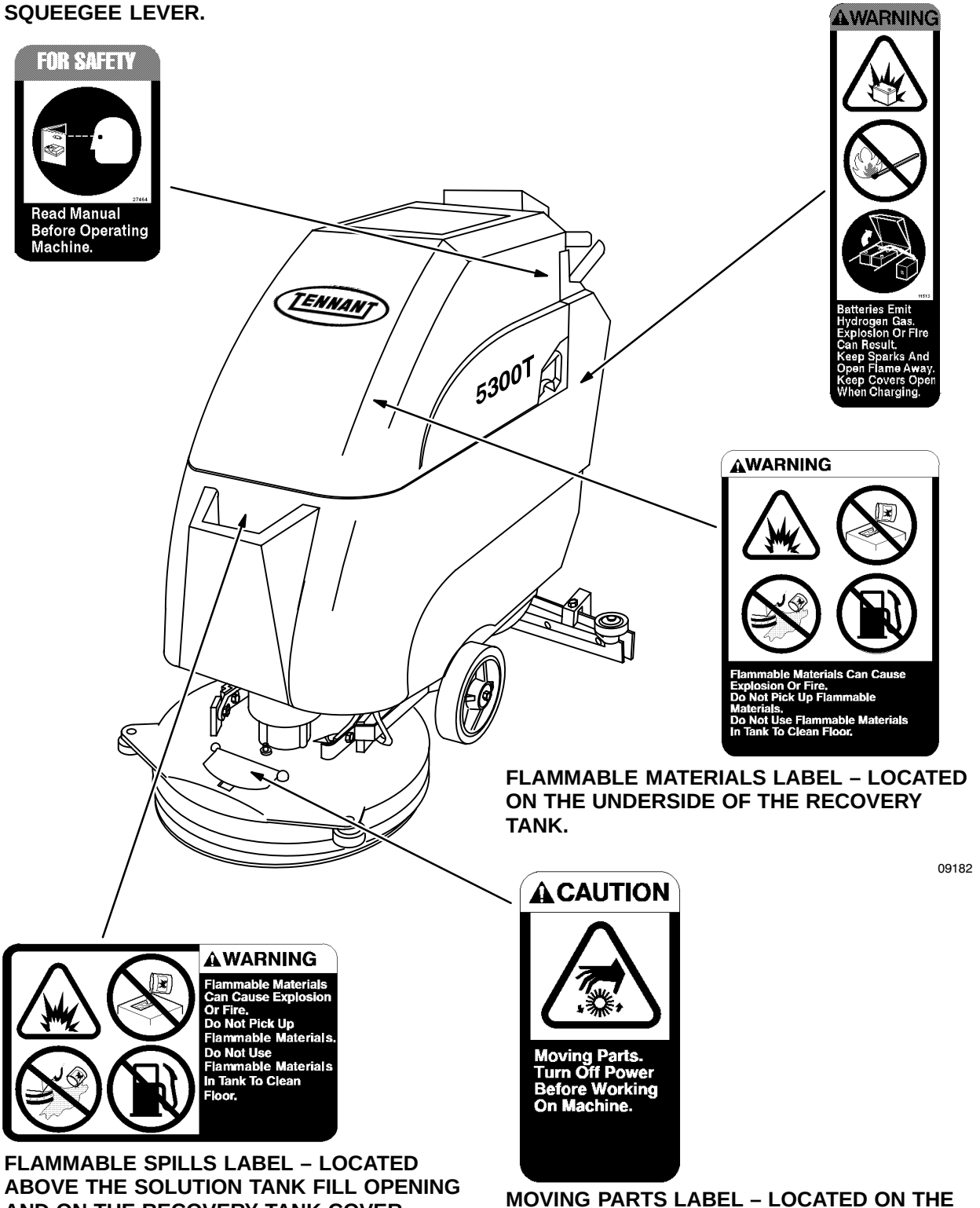
Store the machine indoors, do not expose to the rain.

This product is intended for commercial use.

The following safety labels are mounted on the machine in the locations indicated. If these or any label becomes damaged or illegible, install a new label in its place.

FOR SAFETY LABEL – LOCATED ON THE MACHINE BACK PANEL ABOVE THE SQUEEGEE LEVER.

BATTERY CHARGING LABEL – LOCATED ON THE BOTTOM OF THE OPERATOR CONSOLE.


FOR SAFETY
Read Manual Before Operating Machine.
TENNANT
5300T
WARNING
Batteries Emit Hydrogen Gas. Explosion Or Fire Can Result. Keep Sparks And Open Flame Away. Keep Covers Open When Charging.
WARNING
Flammable Materials Can Cause Explosion Or Fire. Do Not Pick Up Flammable Materials. Do Not Use Flammable Materials In Tank To Clean Floor.
WARNING
Flammable Materials Can Cause Explosion Or Fire. Do Not Pick Up Flammable Materials. Do Not Use Flammable Materials In Tank To Clean Floor.
CAUTION
Moving Parts. Turn Off Power Before Working On Machine.

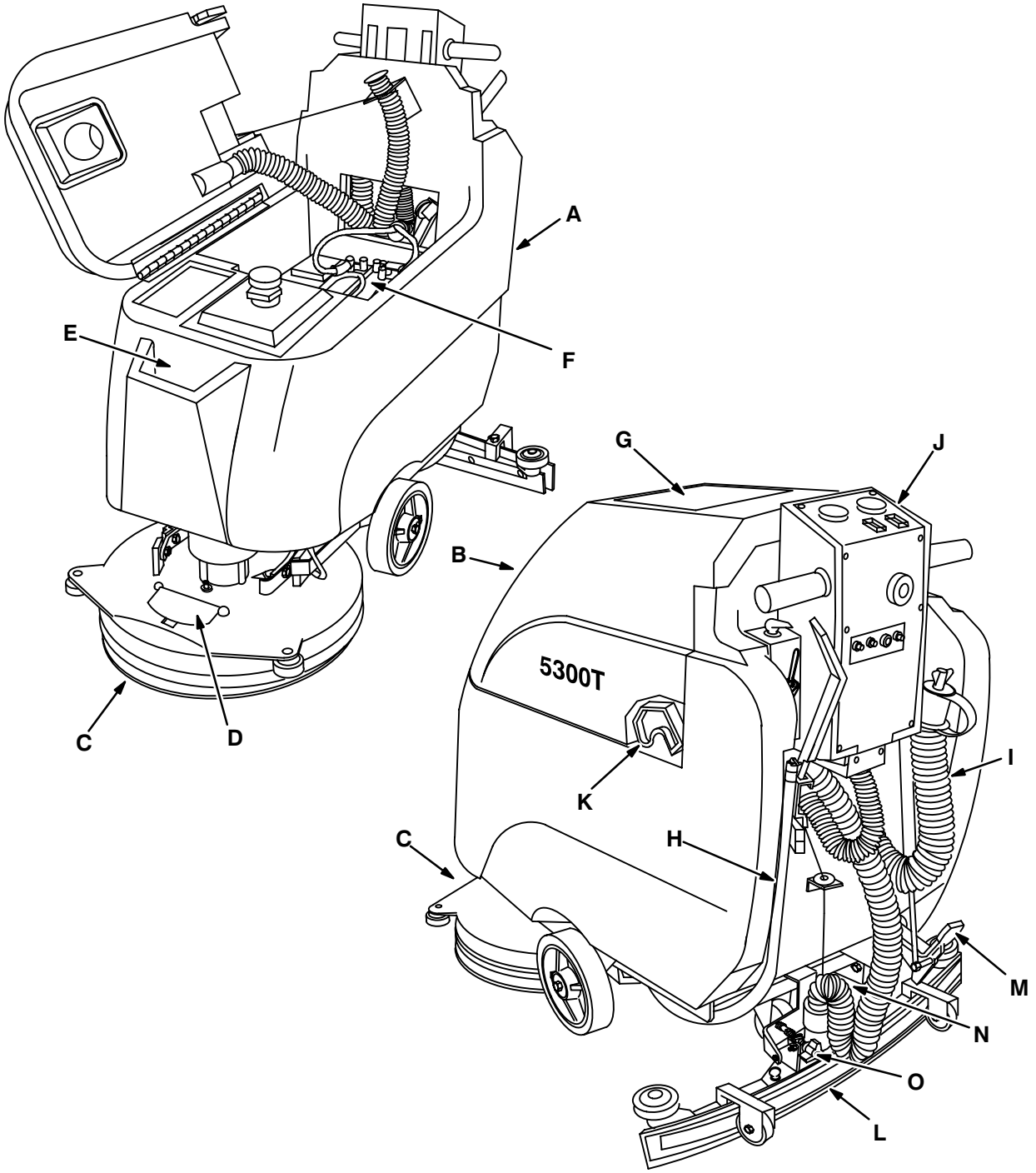
FLAMMABLE MATERIALS LABEL – LOCATED ON THE UNDERSIDE OF THE RECOVERY TANK.

09182

FLAMMABLE SPILLS LABEL – LOCATED ABOVE THE SOLUTION TANK FILL OPENING AND ON THE RECOVERY TANK COVER.

MOVING PARTS LABEL – LOCATED ON THE SCRUB HEAD ACCESS DOOR.

MACHINE COMPONENTS



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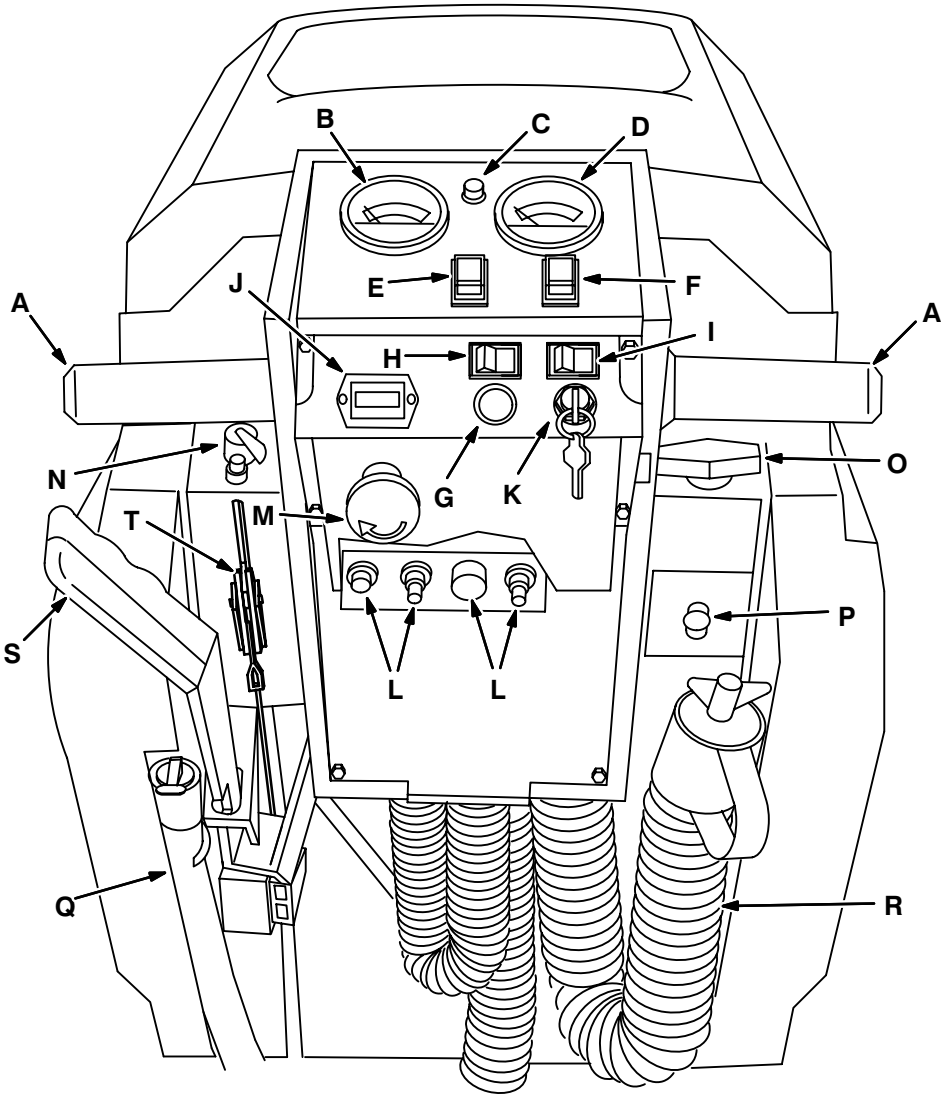
09181

A. Solution Tank
B. Recovery Tank
C. Scrub Head
D. Scrub Head Access Cover
E. Solution Tank Fill Opening
F. Batteries
G. Recovery Tank Cover
H. Solution Tank Hose
I. Recovery Tank Drain Hose
J. Console Panel
K. Stop Arm
L. Squeegee
M. Scrub Head Pedal
N. Squeegee Down Pressure Knob
O. Squeegee Leveling Knob

Home Find... Go To..

CONTROLS AND INSTRUMENTS



A. Steering Handles/Brush and Solution On Switch
B. Battery Discharge Indicator
C. Speed Switch
D. Brush Pressure Gauge
E. Machine Power Switch
F. Solution Switch
G. Pump On Light (Option)
H. ES™ Switch (Option)
I. Power Wand Switch (Option)
J. Hourmeter (Option)
K. On-off Key Switch (Option)
L. Circuit Breakers
M. Power Kill Switch (Option)
N. Solution Flow Knob
O. Brush Pressure Knob
P. Brush Pressure Indicator
Q. Solution Tank Hose
R. Recovery Tank Drain Hose
S. Squeegee Lever
T. Parking Brake Lever (Option)

STORING MACHINE

Before storing the machine for an extended period of time, the machine needs to be prepped to lessen the chance of rust, sludge, and other undesirable deposits from forming. Contact TENNANT service personnel.

TO STORE MACHINE

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake, Turn Off Machine And Remove Key.

1. Make sure the tanks are drained and rinsed out.
2. Un–plug the batteries and charge them properly.

STORAGE INFORMATION

The following steps should be taken when storing the machine for extended periods of time.

1. Drain and clean the solution and recovery tanks.
2. Park the machine in a cool, dry area.
3. Remove the batteries, or charge them after every three months.

MACHINE JACKING

You can jack up the machine for service at the designated locations. Use a jack of adequate capacity and good working condition. Always stop the machine on a flat, level surface and block the tires before jacking the machine up.

TO JACK UP THE MACHINE

1. Park the machine on a level surface.
2. Set the machine parking brake.

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake, Turn Off Machine And Remove Key.

3. Block the machine tires that are not being jacked up, to secure the machine position.

FOR SAFETY: When Servicing Machine, Block Machine Tires Before Jacking Machine Up.

4. Use a jack of adequate capacity to raise the machine. Jack up the machine only at the designated locations.

FOR SAFETY: When Servicing Machine, Jack Machine Up At Designated Locations Only. Block Machine Up With Jack Stands.

5. Block machine up with jack stands or similar devices near the designated jacking locations to secure the machine.
6. Lower the machine onto the jack stands.
7. Check to make sure the machine is secure.
8. When finished servicing the machine, raise the machine off the jack stands.
9. Remove the jack stands from under the machine.
10. Lower the machine.
11. Remove the blocks from the tires.

SPECIFICATIONS

GENERAL MACHINE DIMENSIONS/CAPACITIES

Item	Dimension/capacity
Length	1180 mm (46.45 in)
Width (less squeegee)	545 mm (21.5 in)
Height	985 mm (38.75 in)
Scrub brush diameter	510 mm (20 in)
Squeegee width	770 mm (30.30 in)
Scrubbing path width	510 mm (20 in)
Solution tank capacity	45 L (12 gal)
Recovery tank capacity	49 L (13 gal)
Net weight, less batteries	102 kg (225 lb)

GENERAL MACHINE PERFORMANCE

Item	Measure
Aisle turnaround width	1525 mm (60 in)
Turning radius	735 mm (29 in)
Maximum trailer loading clearance angle	5°

POWER TYPE

Type	Quanity	Volts	Ah Rating	Weight
Batteries	2	12	130 @ 20 hr rate	30 kg (66 lb)
	2	12	180 @ 20 hr rate	53 kg (117 lb)

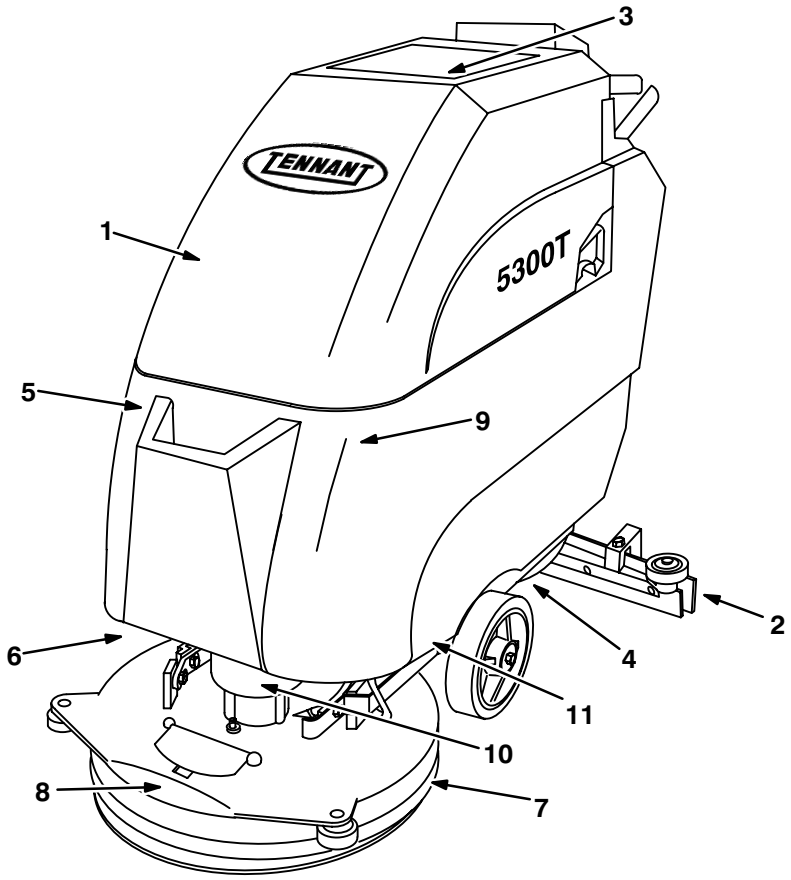
Type	Use	VDC	Kw (hp)
Electric Motors	Scrub brush	24	0.56 (0.75)
	Vacuum fan	24	0.56 (0.75)
	Propelling	24	0.15 (0.20)

Type	VDC	amp	Hz	Phase	VAC
Chargers	24	15	60	1	115
	24	20	60	1	115

TIRES

Location	Type	Size
Front (2)	Solid, non-marking	8 x 2 in
Rear caster (1)	Solid, non-marking	4 x 1.38 in

MAINTENANCE



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MAINTENANCE CHART

Interval	Key	Description	Procedure	Lubricant	No. of Service Points
Daily	2	Squeegee	Check for damage and wear	–	1
			Check deflection	–	1
	8	Scrub brush or pad	Check for damage and wear	–	1
	1	Recovery tank	Clean	–	1
	1	Recovery tank, ES™ mode	Clean ES™ filter	–	1
	3	Recovery tank float screen	Clean	–	1
	5	Solution tank, ES™ mode	Clean	–	1
	6	Machine	Check for leaks	–	1
	7	Scrub head skirt	Check adjustment	–	1
			Check for damage and wear	–	1
100 Hours	4	Rear caster	Lubricate	SPL	1
	2	Squeegee	Check leveling	–	1
400 Hours	9	Vacuum fan motor	Check motor brushes	–	1
	10	Scrub brush motor	Check motor brushes	–	1
	11	Propelling motor	Check motor brushes	–	1

SPL – Special lubricant, Lubriplate EMB grease (TENNANT part no. 01433–1)

HARDWARE INFORMATION

The following charts state standard plated hardware tightening ranges for normal assembly applications. Decrease the specified torque by 20% when using a thread lubricant. Do not substitute lower grade hardware for higher grade hardware. If higher grade hardware than specified is substituted, tighten only to the specified hardware torque value to avoid damaging the threads of the part being threaded into, as when threading into speed nuts or weldments.

STANDARD BOLT TORQUE CHART

Thread Size	SAE Grade 5 Torque ft lb (Nm)	SAE Grade 8 Torque ft lb (Nm)
0.25 in	7–10 (9–14)	10–13 (14–38)
0.31 in	15–20 (20–27)	20–26 (27–35)
0.38 in	27–35 (37–47)	36–47 (49–64)
0.44 in	43–56 (58–76)	53–76 (72–103)
0.50 in	65–85 (88–115)	89–116 (121–157)
0.62 in	130–170 (176–231)	117–265 (159–359)
0.75 in	215–280 (291–380)	313–407 (424–552)
1.00 in	500–650 (678–881)	757–984 (1026–1334)

NOTE: Decrease torque by 20% when using a thread lubricant.

METRIC BOLT TORQUE CHART

Thread Size	Class 8.8 Torque ft lb (Nm)	Class 10.9 Torque ft lb (Nm)
M4	2 (3)	3 (4)
M5	4 (5)	6 (8)
M6	7 (9)	10 (14)
M8	18 (24)	25 (34)
M10	32 (43)	47 (64)
M12	58 (79)	83 (112)
M14	94 (127)	133 (180)
M16	144 (195)	196 (265)
M20	260 (352)	336 (455)
M24	470 (637)	664 (900)

NOTE: Decrease torque by 20% when using a thread lubricant.

BOLT IDENTIFICATION

Identification Grade Marking	Specification and Grade
	SAE–Grade 5
	SAE–Grade 8
	ISO–Grade 8.8
	ISO–Grade 10.9

01395

THREAD SEALANT AND LOCKING COMPOUNDS

Thread sealants and locking compounds may be used on this machine. They include the following:

Locktite 515 sealant – gasket forming material. TENNANT Part No. 75567,15 oz (440 ml) cartridge.

Locktite 242 blue – medium strength thread locking compound. TENNANT Part No. 32676, 0.5 ml tube.

Locktite 271 red – high strength thread locking compound. TENNANT Part No. 19857, 0.5 ml tube.

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DRIVE TRANSAXLE

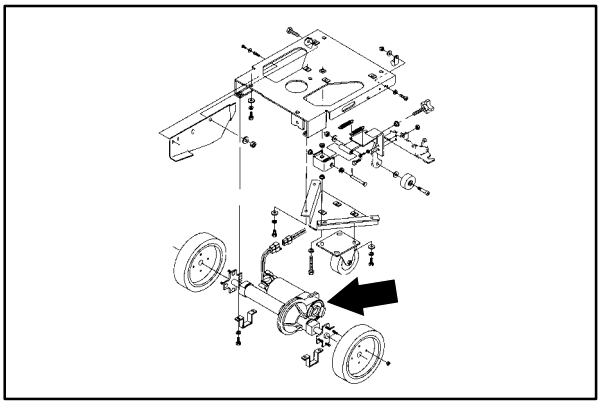
The drive transaxle is attached to the bottom of the frame. The drive motor and drive wheels are attached to the transaxle.

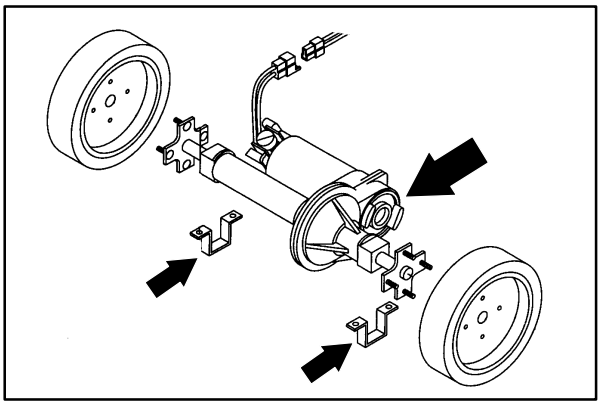
TO REMOVE THE TRANSAXLE

1. Lower the scrub head all the way to the floor.

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

2. Turn the machine power off.
3. Lift the rear of the machine with an over head hoist or other lifting device until the transaxle drive wheels are off the ground.
4. Place a jackstand under the machine frame.
5. Remove the four 0.250 in. hex nuts holding each drive wheel to the transaxle. Remove the drive wheels from the machine.
6. Un–plug the transaxle drive motor from the main harness.
7. Remove the four M8 hex screws and washers holding the two transaxle mount brackets to the machine frame.
8. The transaxle can now be removed from the machine.





TO INSTALL THE TRANSAXLE

1. Lower the scrub head all the way to the floor.

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

2. Turn the machine power off.

3. Lift the rear of the machine with an over head hoist or other lifting device until the transaxle drive wheels are off the ground.

4. Place a jackstand under the machine frame.

5. Position the new transaxle under the machine frame. Make sure the drive motor and electric leads are on the right hand side of the machine.

6. Lift the transaxle up into the machine frame until the mount brackets and M8 hex screws can be reinstalled. Tighten to 18 – 24 Nm (15 – 20 ft lb).

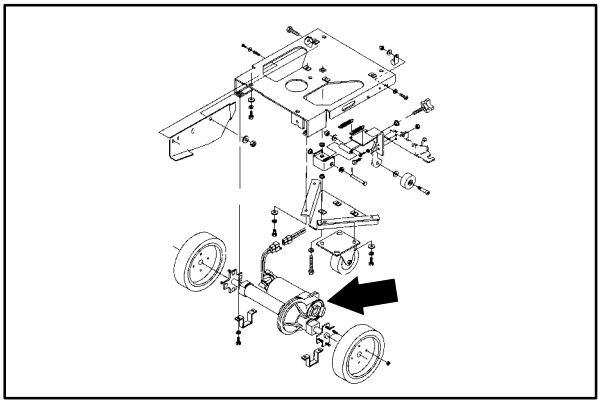
7. Plug the drive motor into the main harness. See schematic in the ELECTRICAL section of this manual.

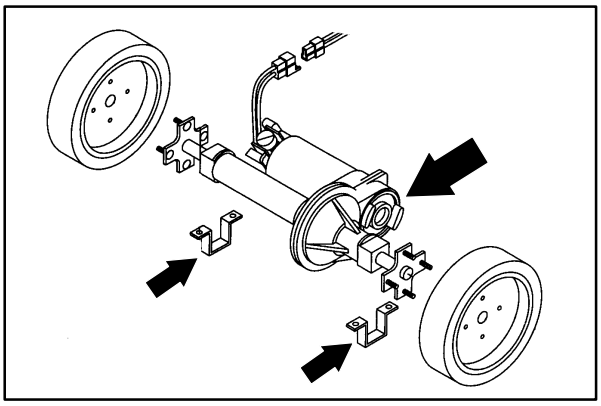
8. Reinstall the drive wheels onto the transaxle using the four 0.250 in. hex nuts. Tighten to 11 – 14 Nm (7 – 10 ft lb).

9. Remove the jack stands and lower the machine to the ground.

10. Raise the scrubber head.

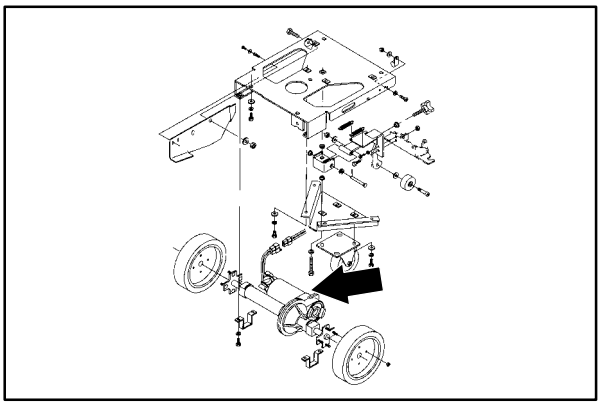
11. Operate the machine, checking for proper operation of the transaxle.





TO REPLACE TRANSAXLE DRIVE MOTOR

The transaxle drive motor and transaxle must be replaced as one unit.



TO REPLACE DRIVE WHEEL/TIRE ASSEMBLY

1. Lower the scrub head all the way to the floor.

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

2. Turn the machine power off.

3. Lift the rear of the machine with an over head hoist or other lifting device until the rear caster is off the ground. Place a jackstand under the machine frame.

4. Place a jackstand under the machine frame.

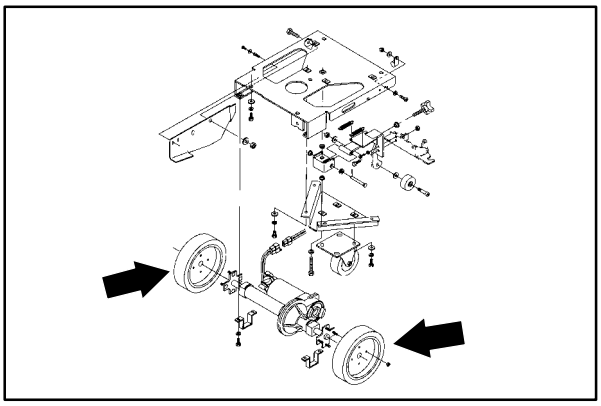
5. Remove the four 0.250 in. hex nuts holding the drive wheel to the transaxle. Remove the drive wheel from the machine.

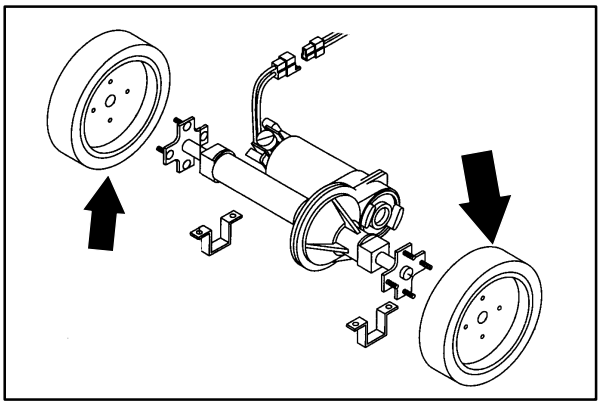
6. Reinstall the new drive wheel onto the transaxle using the four 0.250 in. hex nuts. Tighten to 11 – 14 Nm (7 – 10 ft lb).

7. Remove the jack stands and lower the machine to the ground.

8. Raise the scrubber head.

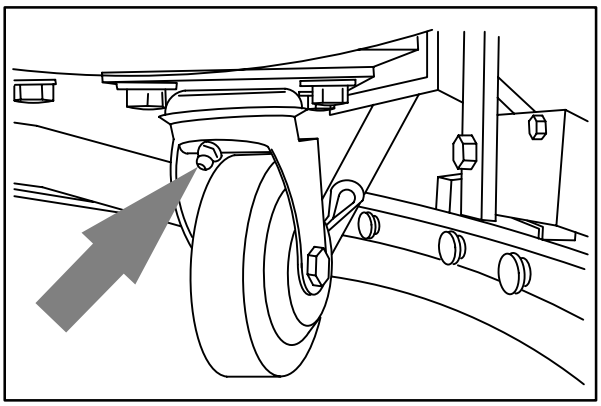
9. Operate the machine, checking for proper operation of the drive wheels.





REAR CASTER

The rear caster has one grease fitting on the caster swivel. Lubricate the caster with a grease gun containing Lubriplate EMB grease (TENNANT part no. 01433–1) every 100 hours of machine operation.



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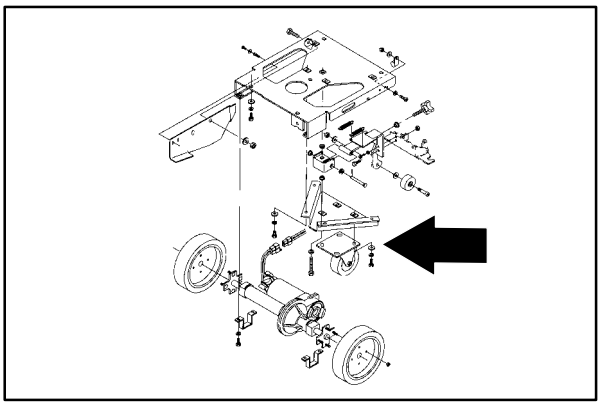
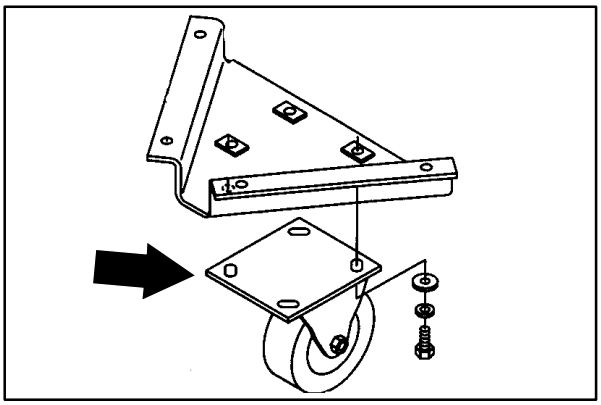
TO REPLACE REAR CASTER

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

1. Turn the machine power off.
2. Lift the rear of the machine with an over head hoist or other lifting device until the rear caster is off the ground. Place a jackstand under the machine frame.
3. Place a jackstand under the machine frame.
4. Remove the four M8 hex screws and washers holding the caster to the machine frame. Remove the caster from the machine.
5. Position the new caster under the machine and reinstall the four M8 hex screws and washers. Tighten to 18 – 24 Nm (15 – 20 ft lb).
6. Remove the jackstand from under the machine frame.
7. Lower the machine to the ground and operate, checking for proper caster operation.





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INTRODUCTION

When the scrubbing mode is used, water flows from the solution tank through the solution valve to the scrub brushes. The brushes scrub the floor. As the machine is moved forward the squeegee wipes the dirty solution off the floor, which is then picked up and drawn into the recovery tank by the vacuum fan.

SOLUTION / RECOVERY SYSTEM

RECOVERY TANK

The recovery tank stores recovered solution. The recovery tank should be drained and cleaned daily.

NOTE: The water must not be hotter than 55° C (130° F), or tank damage may occur. ***Do not*** *use steam to clean the tank.*

The recovery tank float screen should be cleaned daily.

ES™ Option: The ES™ filter should be cleaned daily.

TO REMOVE RECOVERY TANK

1. Turn the machine power off.

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

2. Tilt the recovery tank up.

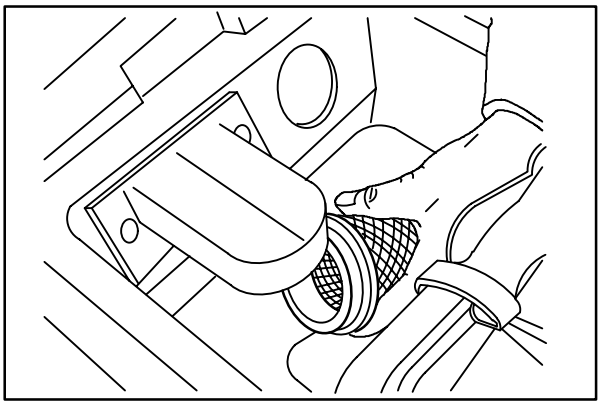
NOTE: Drain the recovery tank.

3. Remove the worm drive clamp holding the drain hose to the recovery tank. Remove the hose.

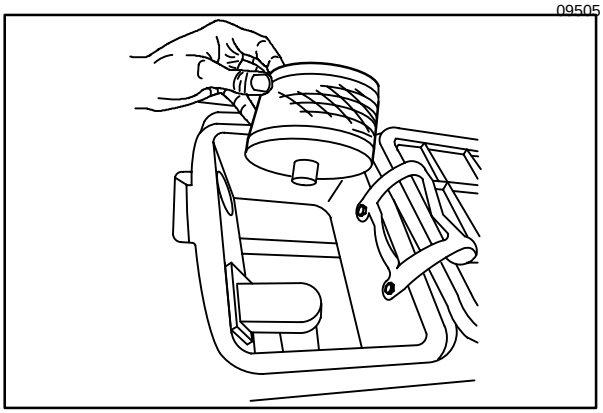
4. Support the recovery tank and remove the M6 pan head screw holding the tank cable assembly to the recovery tank.

5. Keep supporting the tank and remove the four M6 pan head screws holding the pivot hinge to the bottom of the recovery tank.

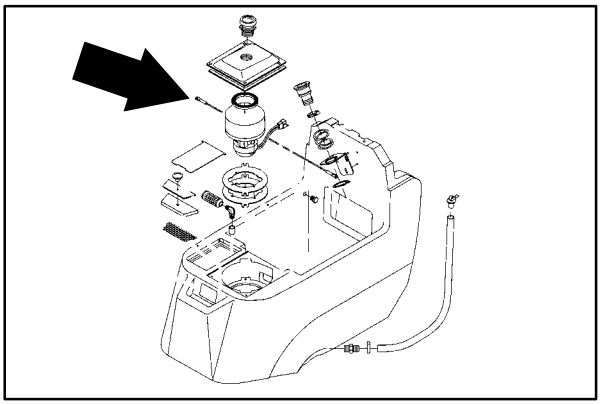
6. The recovery can now be removed from the machine.

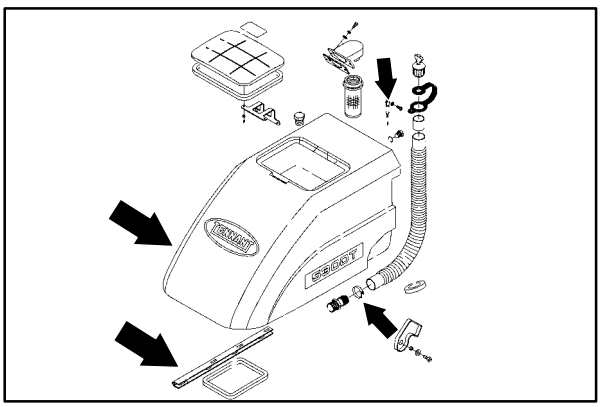


09505



09506





TO INSTALL RECOVERY TANK

1. Turn the machine power off.

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

2. Position the new recovery tank onto the solution tank. Be careful not to damage the gaskets between the tanks.

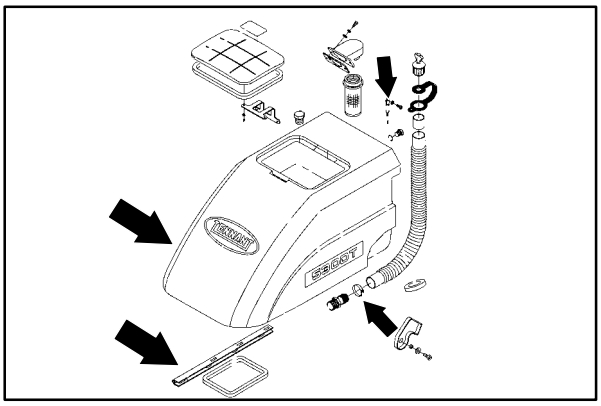
3. Tilt the recovery tank up and support it.

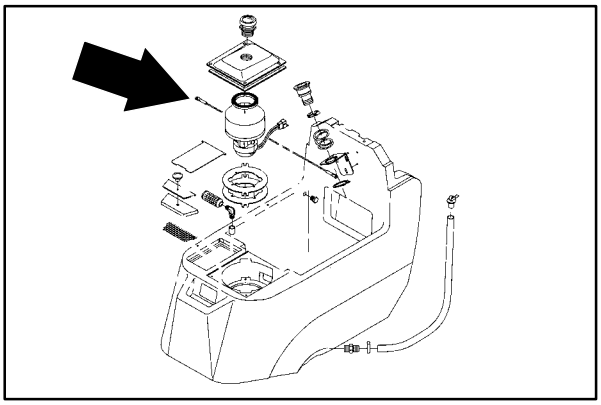
4. Align the four holes in the pivot hinge with the threaded inserts in the recovery tank. Reinstall the four M6 pan head screws and tighten to 11 – 14 Nm (7 – 10 ft lb).

5. Re–attach the tank cable assembly to the recovery tank using the M6 pan head screw. Tighten to 11 – 14 Nm (7 – 10 ft lb).

6. Reinstall the drain hose and worm drive clamp to the bottom of the recovery tank. Hand tighten.

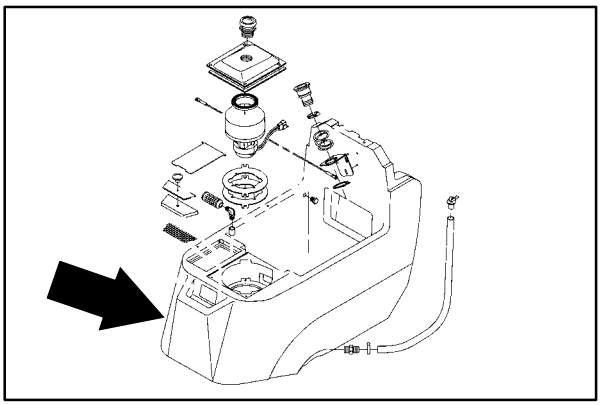
7. Lower the recovery tank down and operate the machine, checking for any leaks.





SOLUTION TANK

The solution tank contains the cleaning solution.



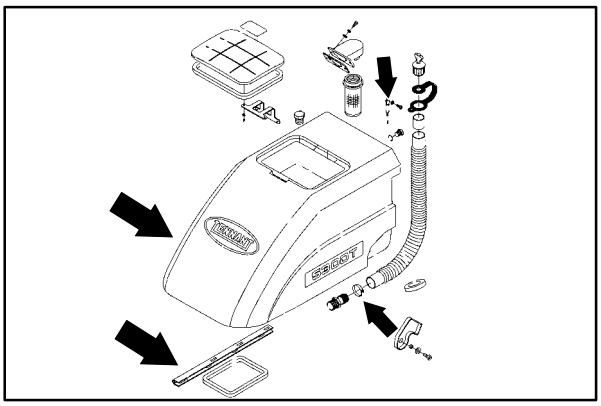
The solution tank does not require regular maintenance. If deposits form on the bottom of the tank, rinse the tank with a strong blast of warm water.

NOTE: The water must not be hotter than 55° C (130° F), or tank damage may occur. ***Do not*** *use steam to clean the tank.*

ES™ Option: The solution tank should be drained and cleaned daily.

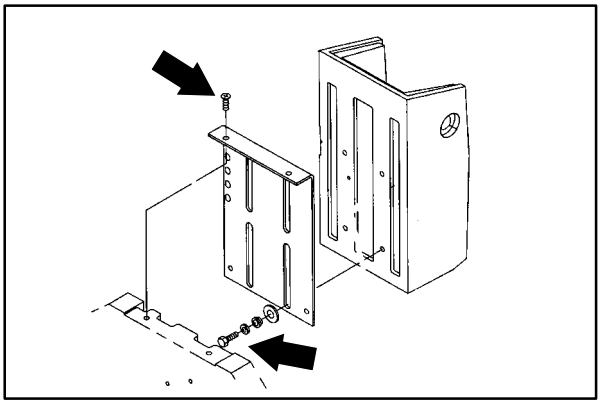
TO REPLACE SOLUTION TANK

1. Turn the machine power off.



FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

2. Remove the recovery tank. See TO REMOVE RECOVERY TANK instructions in this section.
3. Disconnect and remove the two batteries from the machine.
4. Remove the two clamps holding the wire harness to the solution tank in the battery tray area.
5. Disconnect the harness from the scrub brush motor.



6. Disconnect the harness from the transaxle drive motor, vacuum fan, vacuum fan switch, ES™ pump, and Power Wand pump.
7. Remove the two pan head screws and two flat head screws holding the instrument panel mount assembly to the solution tank.
8. Pull the instrument panel assembly and harness back away from the machine.

NOTE: Be sure to document the routing of the electrical harness so it can be installed correctly on the new solution tank.

9. Remove the one M6 pan head screw, one M6 flat head screw, and one M8 hex screw holding the squeegee lift assembly to the solution tank.

10. Pull the squeegee lift assembly back away from the machine.

11. Remove the squeegee assembly from the machine. See REMOVING THE SQUEEGEE instructions in this section.

12. Remove the three M6 pan head screws holding the vacuum fan transition tube to the solution tank.

13. Remove the vacuum fan transition tube assembly and squeegee hose from the machine.

14. Remove the vacuum fan from the machine. See TO REPLACE SCRUBBING VACUUM FAN instructions in this section.

15. Remove the two M5 pan head screws holding the scrub head down pressure knob assembly to the back of the solution tank.

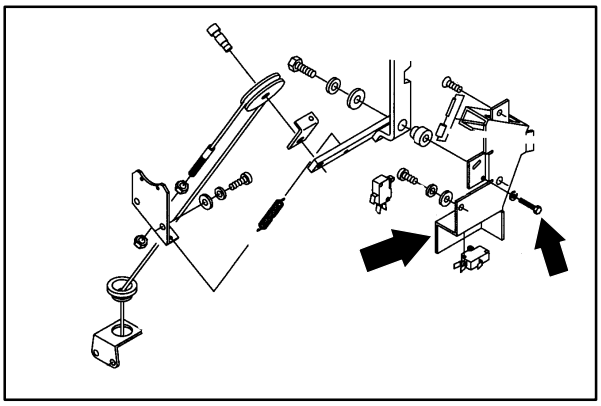
16. Pull the scrub head down pressure knob assembly back away from the solution tank.

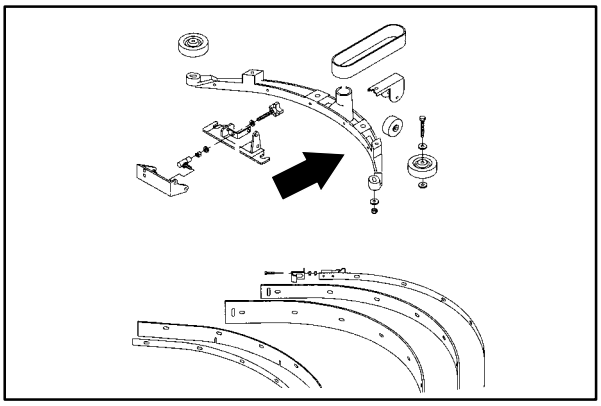
17. Remove the two M5 pan head screws holding the water flow adjustment cable knob assembly to the back of the solution tank.

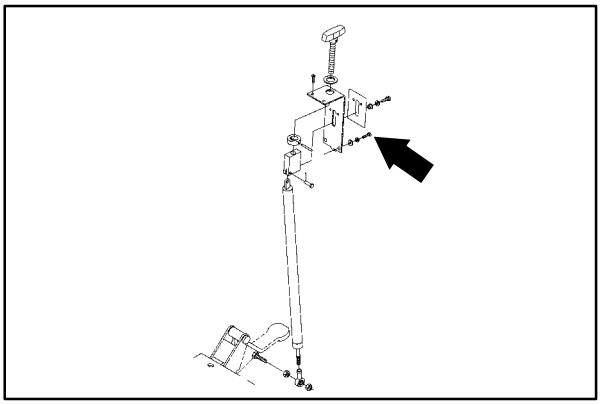
18. Pull the water flow adjustment cable knob assembly back away from the solution tank.

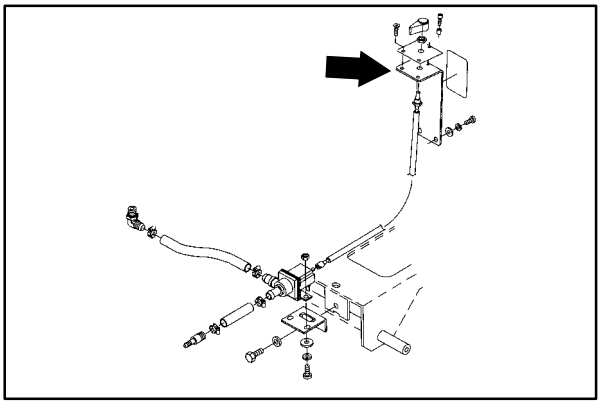
19. The rest of the solution tank replacement is most easily accomplished with the machine on its side. Place a protective cover on the floor and carefully tip the machine over.

NOTE: Use at least two people to tip the machine on its side.





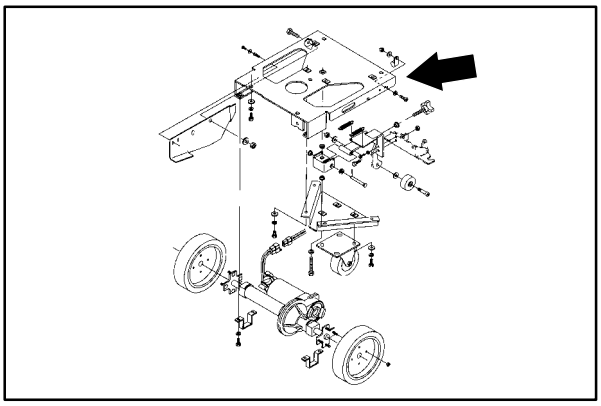




20. Remove the five M8 hex screws holding the main machine frame to the bottom of the solution tank.

21. Pull the frame, transaxle, scrub head, and squeegee mount away from the solution tank.

22. Remove any miscellaneous parts that are still attached to the solution tank. Discard the old tank.

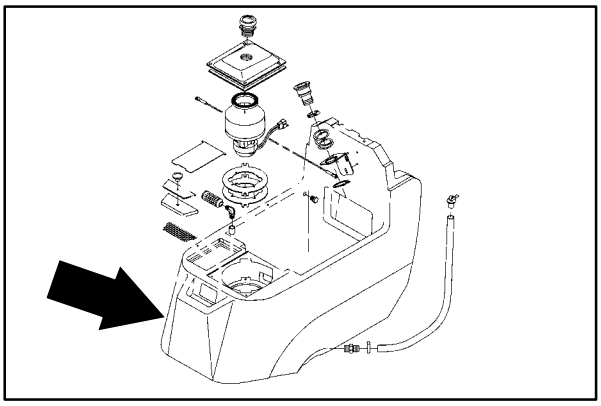


23. Position the new solution tank onto its side with a protective cover underneath.

24. Move the frame, transaxle, scrub head, and squeegee mount back into position under the solution tank.

25. Align the five holes in the main frame with the threaded inserts in the solution tank. Reinstall the five M8 hex screws and washers and tighten to 18 – 24 Nm (15 – 20 ft lb).

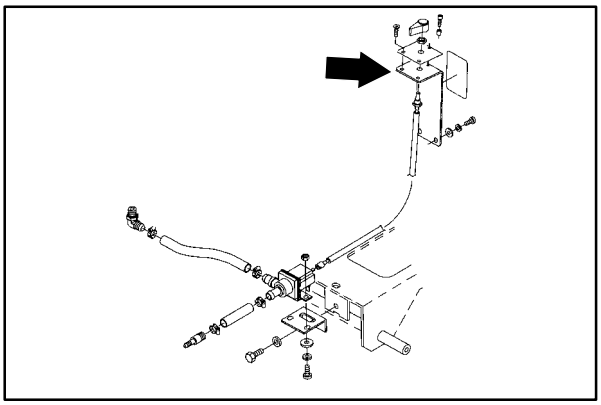
26. Reinstall any miscellaneous parts that were removed in step 22.



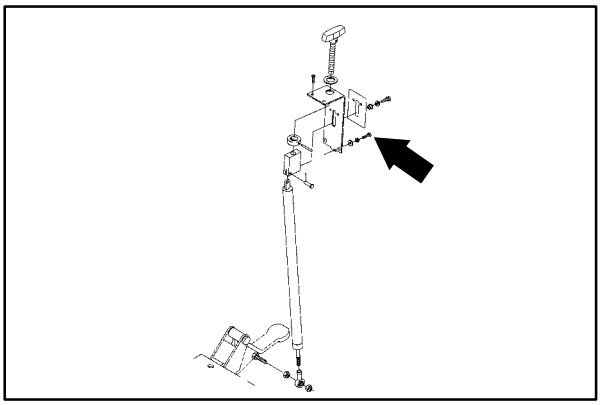
27. The solution tank, main frame assembly should be flipped back up on its wheels at this point.

NOTE: Use at least two people to flip the machine up on its wheels.

28. Position the water flow adjustment cable knob assembly back onto the back of the solution tank. Reinstall the two M5 pan head screws and tighten to 443–575 Ncm (50 – 60 in lb).



29. Position the scrub head down pressure knob assembly back onto the back of the solution tank. Reinstall the two M5 pan head screws and tighten to 443–575 Ncm (50 – 60 in lb).



30. Reinstall the vacuum fan. See TO REPLACE SCRUBBING VACUUM FAN instructions in this section.

31. Reinstall the vacuum fan transition tube assembly and squeegee hose using the three M6 pan head screws and washers. Tighten to 11 – 14 Nm (7 – 10 ft lb).

32. Reinstall the squeegee assembly to the machine. See INSTALLING THE SQUEEGEE instructions in this section.

33. Position the squeegee lift assembly back onto the back, left side of the solution tank. Reinstall the one M6 pan head screw, one M6 flat head screw, and one M8 hex screw. Tighten the M6 screws to 11 – 14 Nm (7 – 10 ft lb). Tighten the M8 screw to 18 – 24 Nm (15 – 20 ft lb).

34. Route the electrical harness on the machine. Make sure to follow the same path as it came out. Reinstall the two clamps in the battery compartment. Hand tighten the hardware.

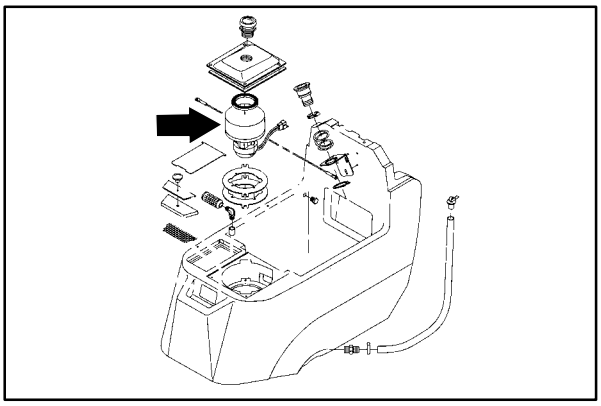
35. Position the instrument panel mount assembly onto the solution tank. Reinstall the two M6 pan head screws and M6 ,two flat head screws. Tighten to 11 – 14 Nm (7 – 10 ft lb).

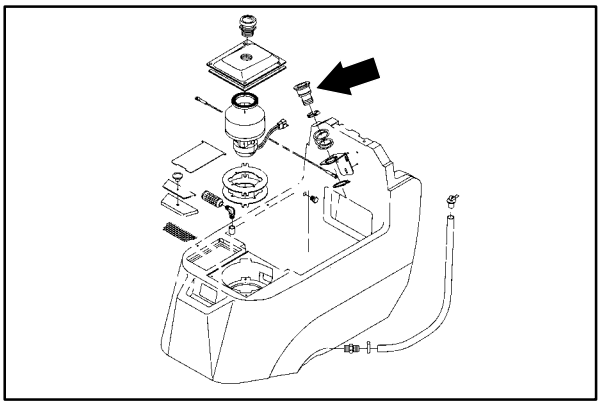
36. Reconnect the transaxle drive motor, scrub brush motor, vacuum fan, vacuum fan switch, ES™ pump, and Power Wand pump to the main harness. See schematic in the ELECTRICAL section of this manual.

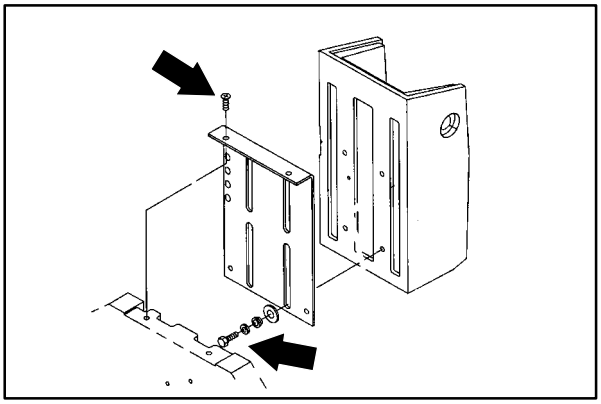
37. Reinstall the batteries into the machine. See schematic in the ELECTRICAL section of this manual for proper cable connections.

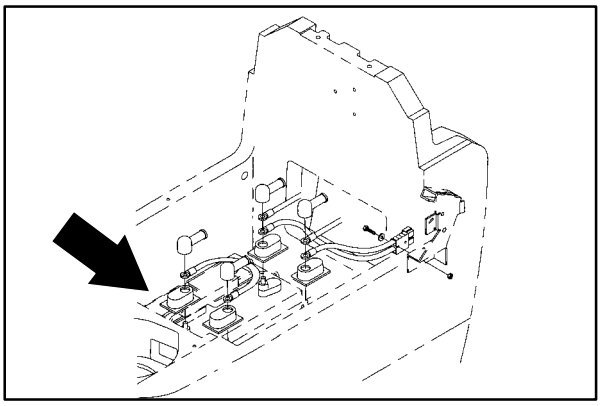
38. Reinstall the recovery tank onto the solution tank. See TO INSTALL RECOVERY TANK instructions in this section.

39. Plug the batteries in, close the recovery tank, start the machine and check all systems for proper operation.









SCRUB HEAD

The scrub head encloses the scrub brush and a solution dispensing system. The scrub head skirt controls over-spray from the scrub brush. Make sure the scrub head skirt touches the floor all the way around when the scrub head is lowered.

Check the skirt for damage or wear daily.

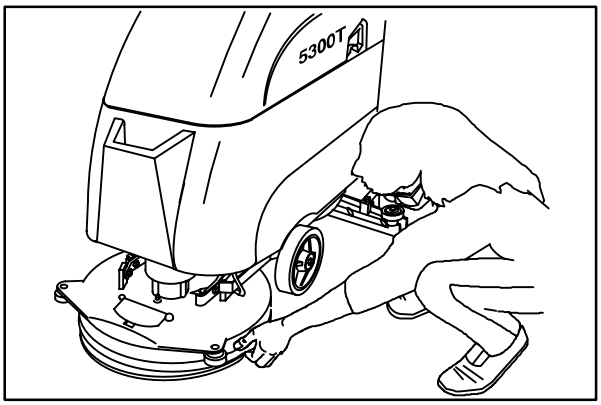
ADJUSTING THE SCRUB HEAD SKIRT

1. Turn the machine power off.

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

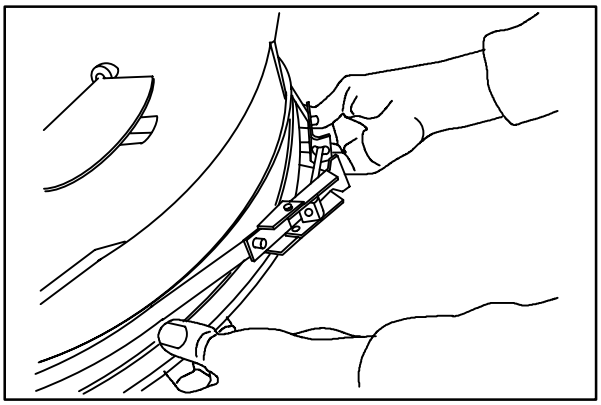
2. Lower the scrub head.

3. Check to see if the scrub head skirt touches the floor all the way around the scrub head.



09522

4. If the skirt needs to be adjusted, loosen the skirt band clamp and move the skirt up or down to touch the floor.



09523

NOTE: Replace the scrub head skirt when it is damaged or no longer is able to touch the floor.

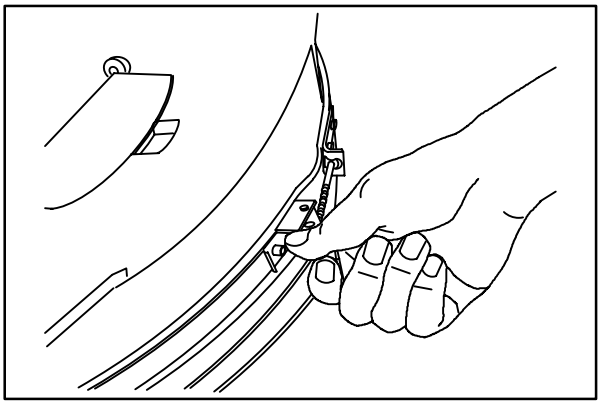
5. Tighten the skirt band clamp.
6. Raise the scrub head.

REPLACING THE SCRUB HEAD SKIRT

1. Turn the machine power off.

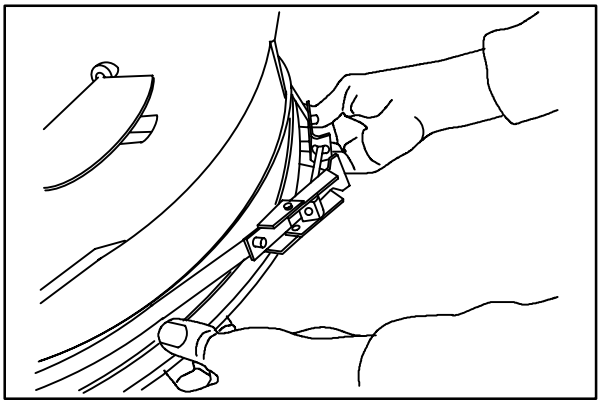
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

2. Raise the scrub head.
3. Loosen the skirt band clamp.



09524

4. Pull the old skirt and band off the scrub head.
5. Put the new skirt on the scrub head. ***Make sure*** the holes in the skirt are facing the rear of the machine.
6. Place the skirt band over the new skirt and tighten the skirt band clamp.
7. Adjust the skirt as stated in *ADJUSTING THE SCRUB HEAD SKIRT*.



09523

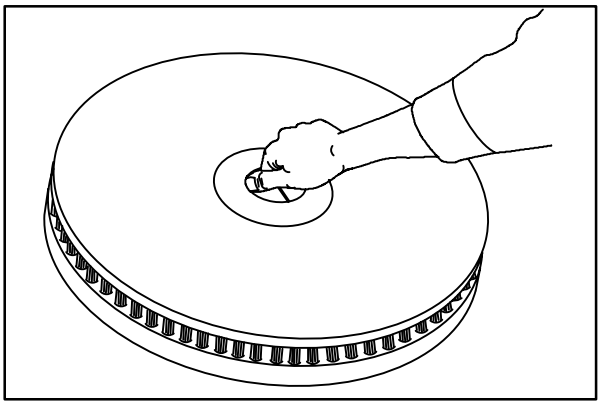
SCRUB BRUSH

The scrub brush should be checked daily for wire or string tangled around the brush or brush drive hub. The brush should also be checked for any damage and wear.

The scrub brush should be replaced if large amounts of bristles are missing, or if the remaining bristles' length is less than 10 mm (0.38 in).

Cleaning pads must be placed on pad drives before they are ready to use. The cleaning pad is held in place by a pad holder.

Cleaning pads need to be cleaned with soap and water after every use.



07326

REPLACING THE SCRUB BRUSH

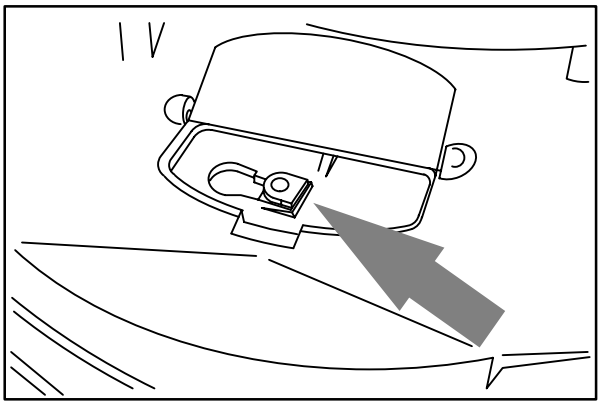
1. Turn the machine power off and set the parking brake if your machine has this option.

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

2. Raise the scrub head with the scrub head lever.

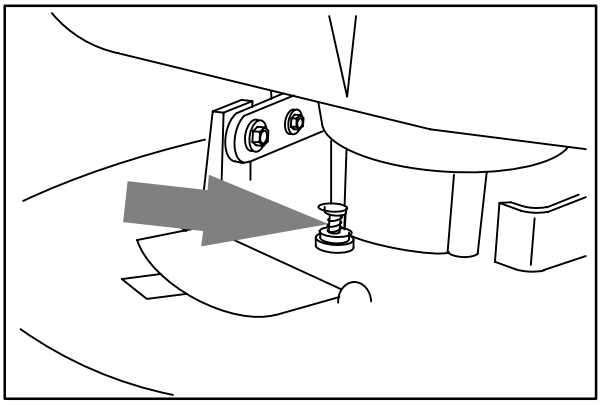
3. Open the access cover on the front of the scrub head.

4. Turn the brush until you can see the brush drive pin.



09525

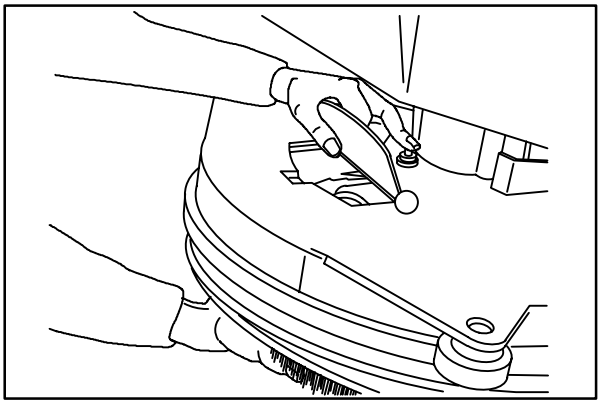
5. Press down on the brush lock pin.



09526

6. Turn the brush clockwise. The brush will drop off the brush drive hub.

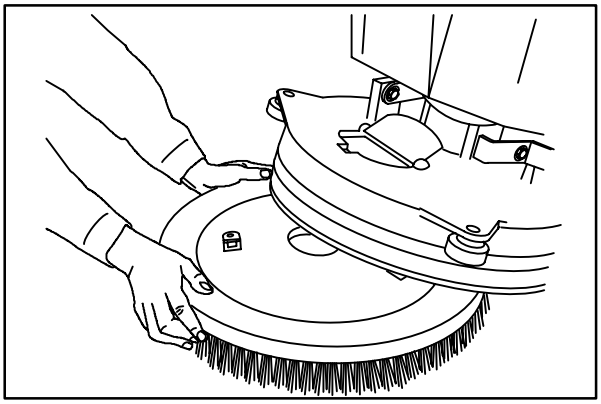
7. Pull the brush out from under the scrub head.



09527

8. Place the scrub brush on the floor in front of the scrub head. Make sure one of the brush drive pins is facing front. Push the brush under the scrub head.

9. Make sure one of the drive pin slots can be seen through the access opening.



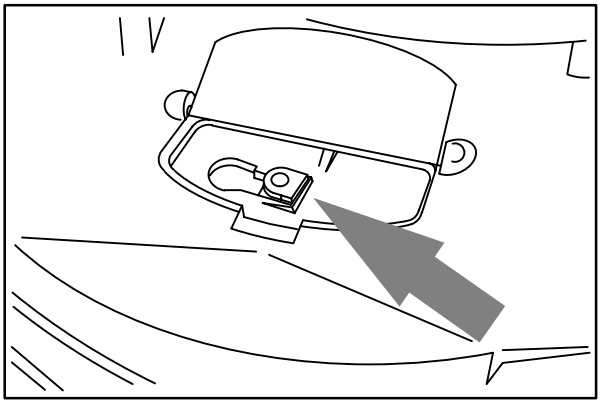
09528

10. Line up the brush drive pin on the brush, with the drive pin slot on the drive plate.

11. Lift the scrub brush from underneath onto the brush drive hub. Turn the brush counter-clockwise to engage the drive pins into the drive slots.

12. Check the brush to make sure it is securely mounted on the brush drive hub.

13. Close the scrub head access cover.



09525

SCRUB BRUSH DOWN PRESSURE GROUP

TO REPLACE BRUSH PRESSURE TEE HANDLE

1. Turn the machine power off and set the parking brake if your machine has this option.

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

2. Remove the four phillips head mounting screws that hold the bracket in place.

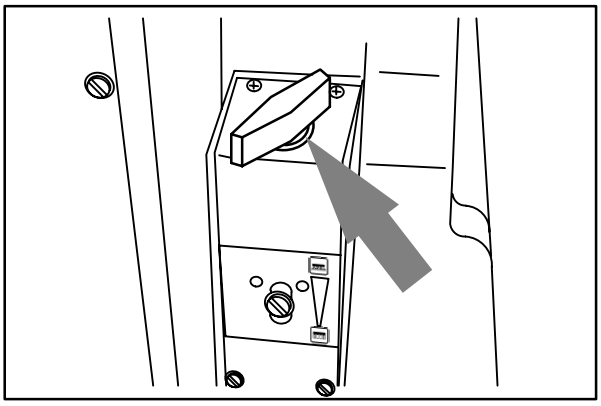
3. Remove the screw going through the slot in the bracket that is threaded into the down pressure coupler. Un–thread the tee knob from the coupler.

4. Drive the pin out of the collar using a 1/8 inch drift pin.

5. Remove the collar from the tee knob, remove the tee knob from the bracket.

6. Install the replacement tee knob into the bracket. Install the collar and pin.

7. Thread the tee knob into the down pressure coupler and reassemble the remaining parts, reversing the procedures in steps 1 and 2.



09480

TO REPLACE DOWN PRESSURE SHOCK ABSORBER

1. Turn the machine power off and set the parking brake if your machine has this option.

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

2. Remove the 4 phillips head mounting screws that hold the bracket in place.

3. Disconnect the top portion of the shock from the down pressure coupler by removing the cotter pin and the clevis pin.

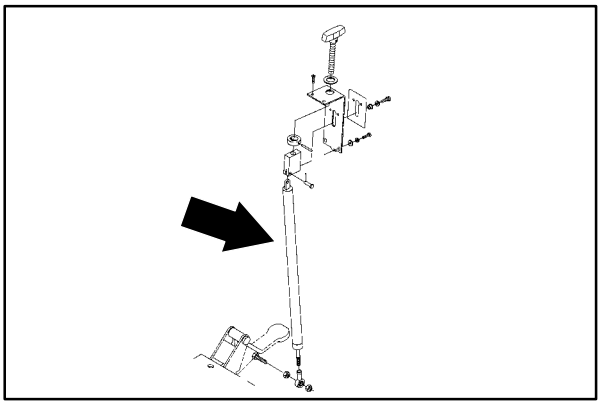
4. Using a 13 mm wrench remove the nut that secures the rod-end portion of the shock to the foot pedal.

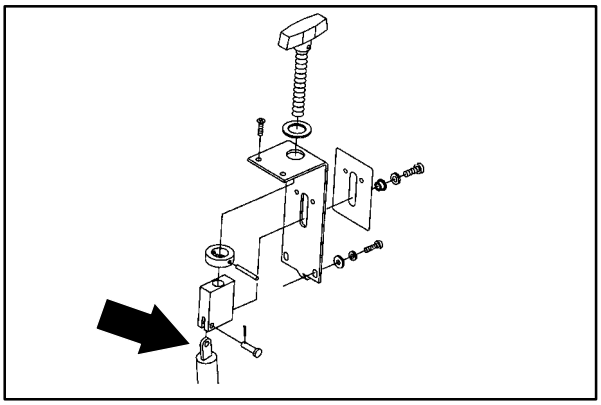
5. Un–thread and remove the rod-end from the shock shaft. It is not necessary to remove the bolt from the rod-end assembly unless replacing the rod-end.

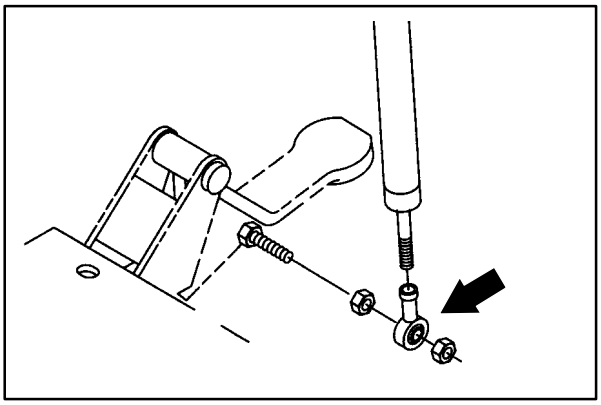
6. Thread the rod-end assembly on to the new shock. HAND TIGHTEN ONLY!

7. Install the new shock absorber into the machine, reversing the procedures in steps 1–3.

NOTE: Connect the rod-end to the foot pedal first, then assemble the top section of the assembly.







TO REPLACE SCRUB BRUSH MOTOR

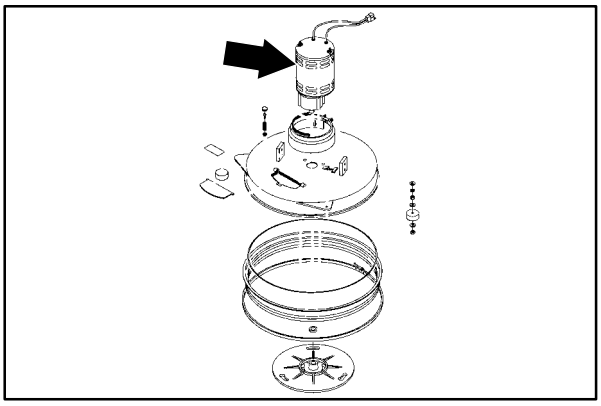
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

NOTE: To make access to certain components in this procedure easier, removal of the vacuum fan is recommended. See TO REMOVE VACUUM FAN instructions in this section.

1. Using the foot pedal, lower the scrubber head to the floor.

2. Reach through the vacuum fan cavity and disconnect the spring from the scrub head level bracket.

NOTE: The spring is attached to the second slot from the bottom, on the bracket.



3. Snip the plastic wire ties on the motor leads and unplug the motor pigtail from the harness plug.

4. Remove the phillips head screw and clamp holding the solution feed tube in position. Disconnect the feed hose from the scrubber head.

NOTE: Mark the hose 38 mm (1-1/2) inches from the end. When pushing hose back into the head, stop at the mark.

5. Reach through the vacuum fan cavity and using two 10 mm wrenches disconnect the head level cable from the scrub head level bracket.

NOTE: The cable and hardware are connected to the center hole in the top of the bracket.

6. Using a 13 mm wrench, remove the two bolts that mount the pivot bracket to the head lift.

ATTENTION: In this step the scrubber head assembly's total weight is relieved from the front of the machine. This may cause the balance of the machine to shift dramatically.

7. Lift up the front of the machine enough to clear the top of the scrub motor. Roll the machine backwards far enough to expose the motor and scrubber head assembly.

8. Position the scrub head assembly with motor upside down, remove the brush drive hub using a 13 mm socket and ratchet.

9. Using a 14 mm socket and ratchet, remove the 4 bolts that secure the motor and gearbox to the scrubber head.

NOTE: The orientation of the motor / gearbox on the scrubber head before disassembly. The motor and gearbox are considered a unit and <u>are not</u> available separately!

10. Remove motor and gearbox from scrubber head.

11. Install the replacement motor and gearbox assembly on to the scrubber head. Reinstall the unit into the machine, reversing the procedures in steps 1–8 of these instructions.

SQUEEGEE

The squeegee channels water into the vacuum fan suction. The front blade channels the water, and the rear blade wipes the floor.

Check the squeegee blades for damage and wear daily. Rotate or replace either of the squeegee blades if the leading edge is torn or worn half-way through the thickness of the blade.

The squeegee can be adjusted for leveling and deflection. The deflection of the squeegee blades should be checked daily, or when scrubbing a different type of floor. The leveling of the squeegee should be checked every 100 hours of machine operation.

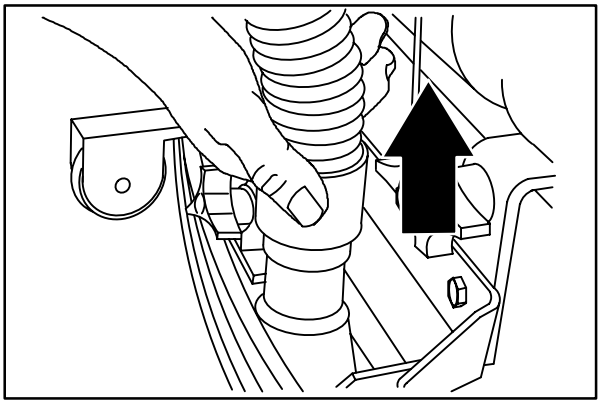
The squeegee can be removed from the squeegee pivot so the squeegee will not be damaged during transport of the machine.

REMOVING THE SQUEEGEE

1. Turn the machine power off and set the parking brake if your machine has this option.

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

2. Raise the squeegee.
3. Remove the squeegee suction hose from the squeegee.
4. Loosen the two mounting thumbscrews.
5. Pull the squeegee off the machine.



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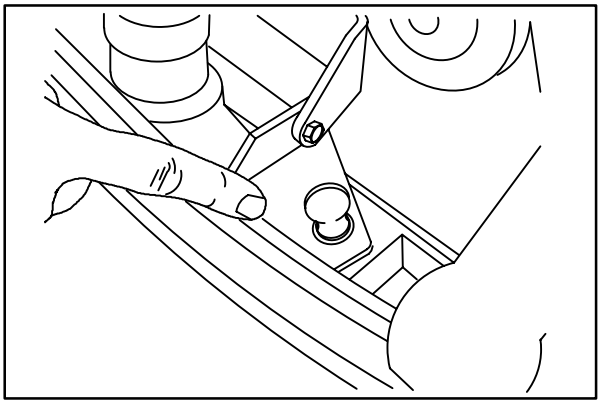
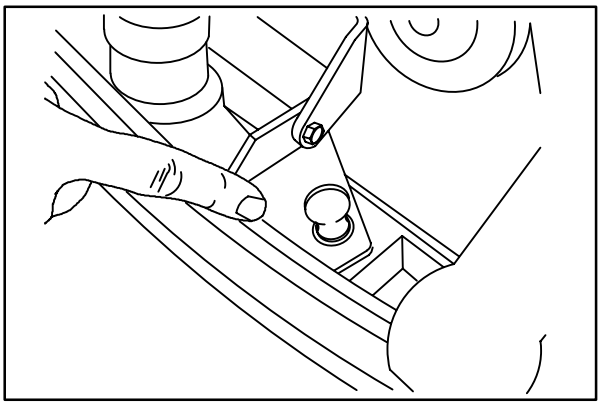


09533

INSTALLING THE SQUEEGEE

1. Make sure the squeegee is raised.
2. Place the squeegee under the squeegee pivot.
3. Line up the mounting studs on the squeegee, with the mounting slots on the squeegee pivot.
4. Mount the squeegee to the squeegee pivot with the mounting thumbscrews. Hand tighten
5. Replace the squeegee suction hose on the squeegee.



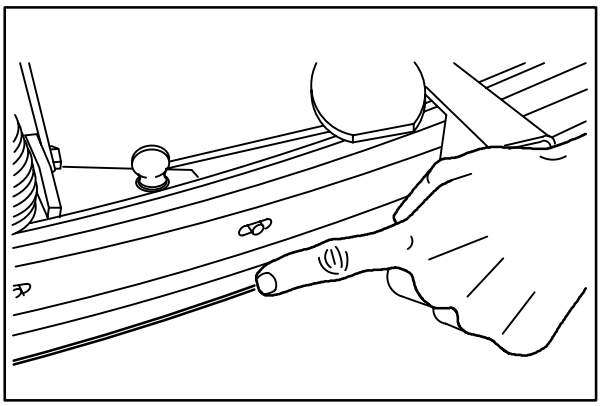
09533

LEVELING THE SQUEEGEE

Leveling of the squeegee assures even contact the length of the squeegee blade with the surface being scrubbed. Make sure this adjustment is done on an even, level floor.

1. Turn the machine power on.
2. Lower the squeegee.
3. Drive the machine forward, then turn the machine power off.
4. Look at the deflection of the squeegee blade, over the full length of the squeegee blade.
5. If the deflection is not the same over the full length of the blade, turn the squeegee leveling knob counter-clockwise to increase the deflection at the ends of the squeegee.

   Turn the squeegee leveling knob clockwise to decrease the deflection at the ends of the squeegee blade.
6. Push the machine forward again to check the squeegee blade deflection.
7. Readjust the squeegee blade deflection if necessary.



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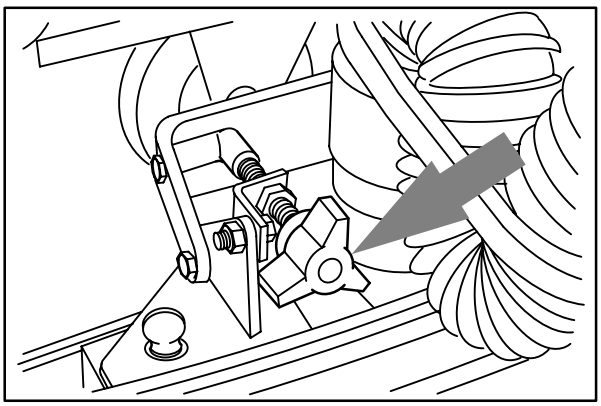
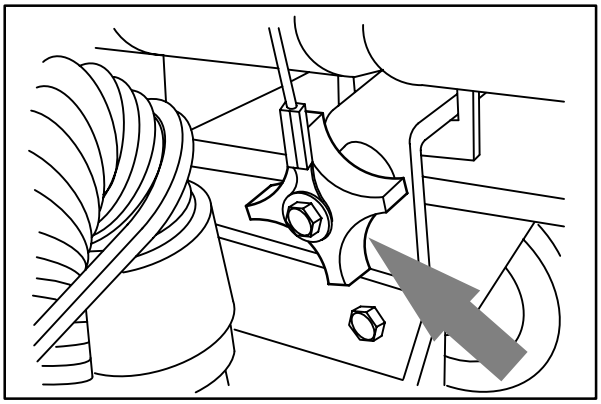


09488

ADJUSTING SQUEEGEE BLADE DEFLECTION

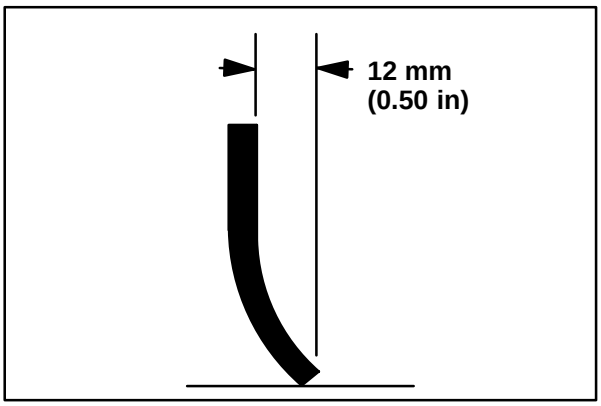
Deflection is the amount of curl the squeegee blade has when the machine moves forward with the squeegee lowered to the floor. The best deflection is when the squeegee wipes the floor just dry with a minimum amount of deflection.



09487

1. Turn the machine power on.
2. Lower the squeegee.
3. Drive the machine forward, and look at the deflection of the squeegee blade. The correct amount of deflection is 12 mm (0.50 in) for scrubbing smooth floors and 15 mm (0.62 in) for rough floors.
4. Turn the machine power off.
5. To adjust the amount of deflection, turn the squeegee deflection knob counter-clockwise to decrease the blade deflection.

   Turn the squeegee deflection knob clockwise to increase blade deflection.
6. Push the machine forward again to check the squeegee blade deflection.
7. Readjust the squeegee blade deflection if necessary.



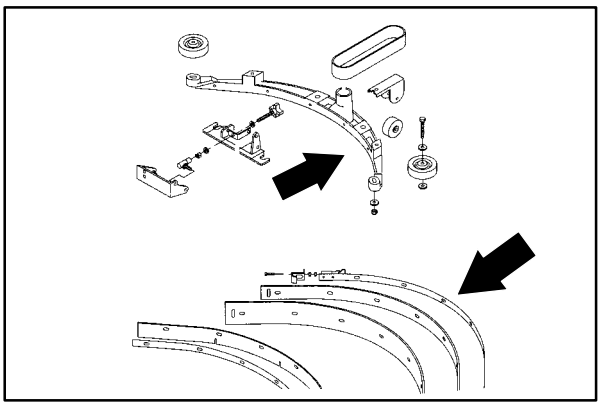
03719

SQUEEGEE BLADES

The squeegee has two squeegee blades. The front blade has two wiping edges. To use both of them, rotate the blade end-for-end.

The rear blade has four wiping edges. To use them all, start with one wiping edge. To use the next wiping edge, rotate the blade end-for-end. To use the next wiping edge, rotate the top edges down, bottom edges up. To use the last edge, rotate the blade end-for-end.

Replace any worn or damaged squeegee blades.



REPLACING OR ROTATING THE FRONT SQUEEGEE BLADE

1. Turn the machine power off and set the parking brake if your machine has this option.

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

2. Make sure the squeegee is raised off the floor.

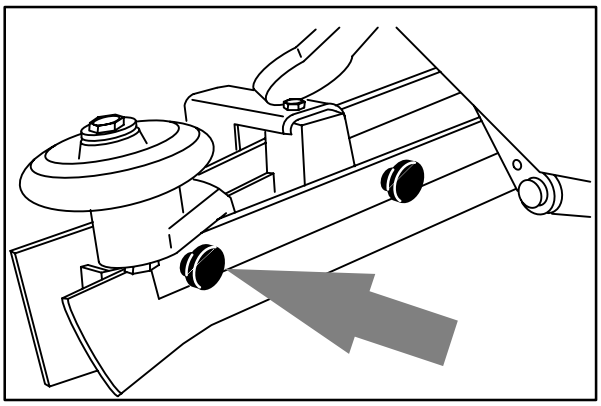
3. Remove the six thumbscrews holding the retainer and squeegee blade to the squeegee frame.

4. Pull the squeegee blade off the squeegee frame.

5. Rotate the squeegee blade end for end to allow a new edge to face the front of the machine.

6. Line up the squeegee blade and the retainer to the squeegee frame

7. Secure the blade and retainer to the squeegee frame with the six thumbscrews.



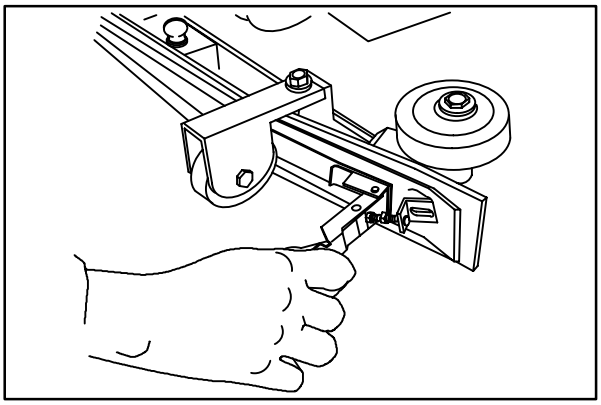
09532

REPLACING OR ROTATING THE REAR SQUEEGEE BLADE

1. Turn the machine power off and set the parking brake if your machine has this option.

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

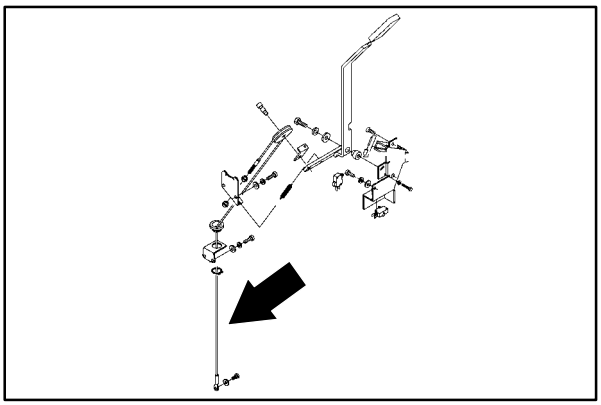
2. Make sure the squeegee is raised off the floor.
3. Loosen the retainer clamp and remove the retainer from the squeegee frame.
4. Remove the backup strip the squeegee blade from the squeegee frame.
5. Replace or rotate the squeegee blade to allow a new edge to face the front of the machine.
6. Place the squeegee blade and backup strip on the squeegee frame
7. Secure the squeegee blade and backup strip with the retainer. Tighten the retainer clamp.
8. Adjust the squeegee blade leveling and deflection as stated in *LEVELING THE SQUEEGEE* and *ADJUSTING SQUEEGEE BLADE DEFLECTION.*



09531

TO REPLACE SQUEEGEE LIFT CABLE

1. Turn the machine power off and set the parking brake if your machine has this option.

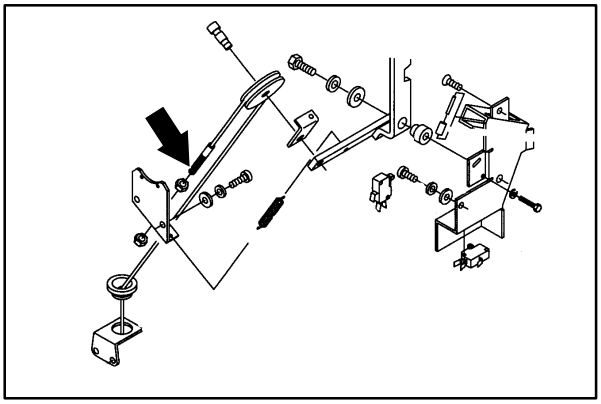


FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

2. Release the squeegee lift arm and lower the squeegee to the floor.

3. Using a 3/16 inch allen wrench remove the screw that holds the cable pulley to the lift arm.

NOTE: Document how the water cable is routed before removing.



4. Remove both hex nuts that mount the threaded cable end to the cable bracket. Use a 7/16 inch open-end wrench.

5. Pull the cable end through the cable bushing.

6. Remove the phillips head screw that mounts the eyelet end of the cable to the adjustment knob.

7. To install the replacement cable, reverse steps 1–5.

NOTE: After running the threaded cable end up through the cable bushing, install one hex nut onto the cable end. Install the nut so there is 25 mm (1 in.) of thread from the nut to end of the stud.

TO REPLACE WATER SOLENOID VALVE

1. Turn the machine power off and set the parking brake if your machine has this option.

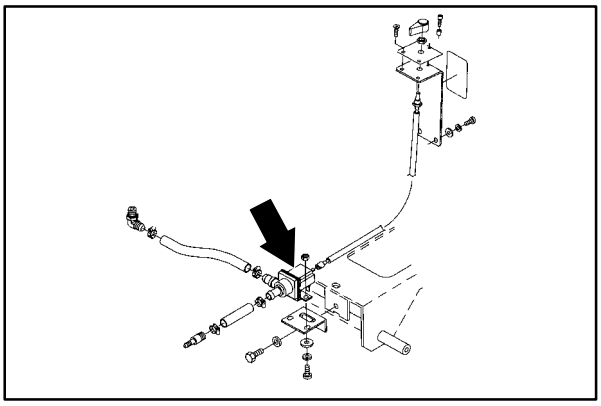
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

2. Block the left transport wheel off the floor and remove the wheel, using a 13 mm socket and ratchet.

NOTE: Drain both tanks first! Place the scrub head in the down position.

3. Using a 13 mm open-end wrench, remove the bolt that secures the valve bracket to the main frame.

4. Orientate the water valve and cable into position so that the set screw holding the cable end to the shaft on the valve can be loosened. Use a 5/64 inch or 2 mm allen wrench.

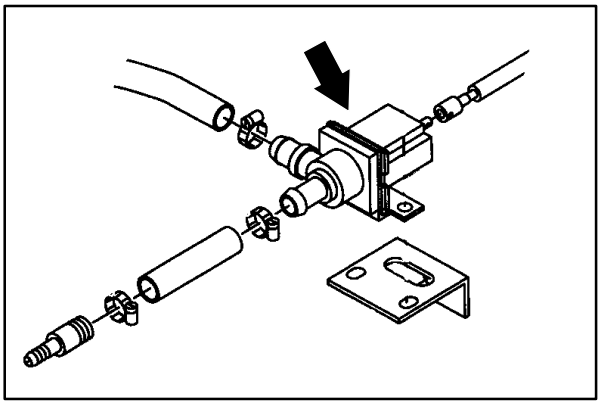


5. Disconnect both wires and both hoses from the valve and remove the valve.

6. Using a 10 mm wrench and a phillips head screwdriver remove the valve from the bracket.

7. Install the replacement valve to the bracket.

8. Reconnect the water control cable to the shaft on the valve. Make sure the set screw seats in the hole on the valve shaft.



9. Reconnect both wires and both hoses to the valve.

10. Reinstall the water valve bracket to the main frame.

11. Reinstall the left wheel, remove blocks and set machine on floor.

TO REPLACE WATER FLOW CONTROL CABLE

1. Turn the machine power off and set the parking brake if your machine has this option.

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

2. Loosen the slotted set screw on the control knob and remove knob.

3. Using a 1/2 inch wrench remove lock nut on cable.

4. Remove all four phillips head mounting screws that hold the bracket to the tank body. Remove the bracket.

5. Pull the water control cable out of its installed position next to the console and lay it on the floor.

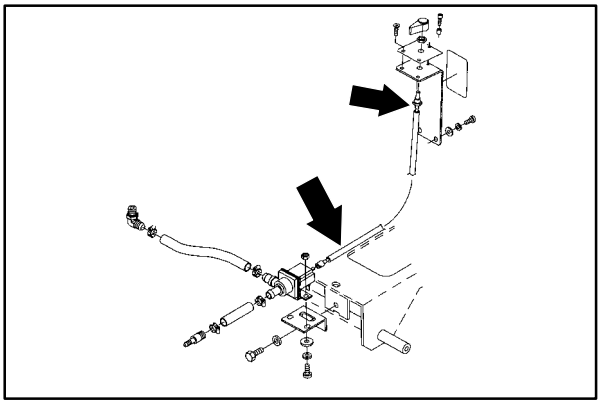
NOTE: Document how the water cable is routed before removing.

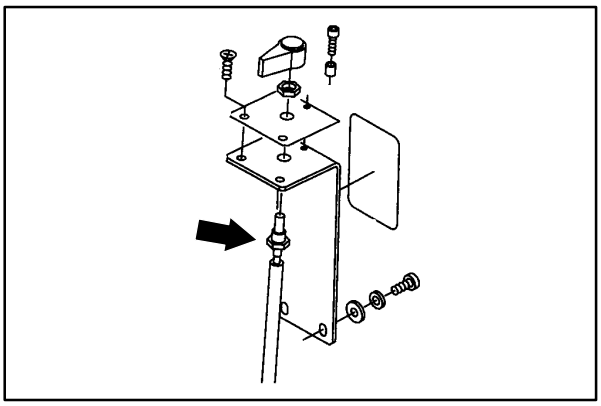
6. Block the left transport wheel off the floor and remove the wheel, using a 13 mm socket and ratchet.

NOTE: Drain both tanks first! Place the scrub head in the down position.

7. Using a 13 mm open-end wrench, remove the bolt that secures the valve bracket to the main frame.

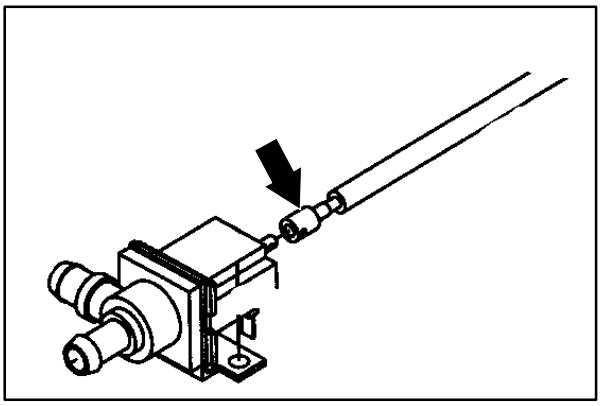
8. Orientate the water valve and cable into position so that the set screw holding the cable end to the shaft on the valve can be loosened. Use a 5/64 inch or 2 mm allen wrench.





9. Pull the cable out from between the solution tank and frame.

NOTE: Document how the cable is routed before removing.

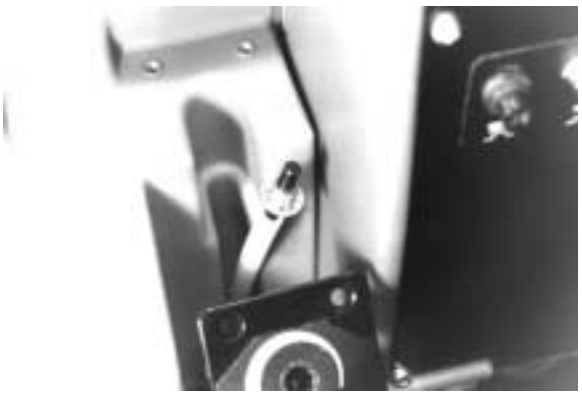


10. Feed the new cable between the solution tank and frame and reconnect it to the water valve shaft. Make sure the set screw seats in the hole on the valve shaft.

11. Reinstall the water valve bracket to the main frame.

12. Reinstall the left wheel, remove blocks and set machine on floor.

13. Reinstall the opposite end of the control cable to the bracket and install the bracket onto the solution tank.

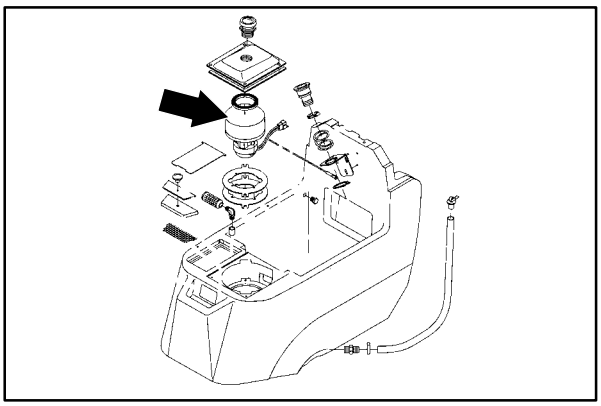


14. With your fingers, twist the end of the water control cable clockwise as far as possible. Install the control knob on the cable shaft with the indicator portion of the knob pointing in the minimum flow position. Tighten down the slotted set screw on the knob.

NOTE: Test the control cable for proper water flow.

SCRUB VACUUM FAN

The scrub vacuum fan, when activated, creates a vacuum in the recovery tank. Water is pulled from the rear squeegee to the recovery tank through a vacuum hose.



TO REPLACE SCRUBBING VACUUM FAN

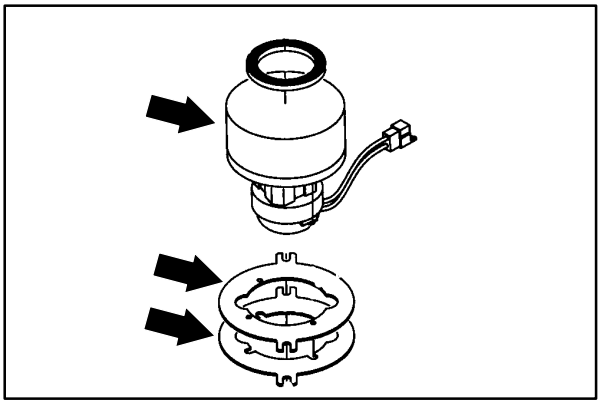
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake, Turn Off Machine And Remove Key.

1. Tilt the recovery tank up.

NOTE: Drain the recovery tank.

2. Remove the 4 phillips head screws that mount the vacuum motor cover to the solution tank.

3. Using a 1/2 inch socket and ratchet remove the two bolts that mount the vacuum motor to the solution tank, pull motor out of cavity.



4. To remove the vacuum motor from the machine completely, snip any wire ties on the vacuum motor leads and unplug the motor from the harness connection.

5. Plug the replacement motor into the harness connector and install wire ties. See schematic in the ELECTRICAL section of this manual.

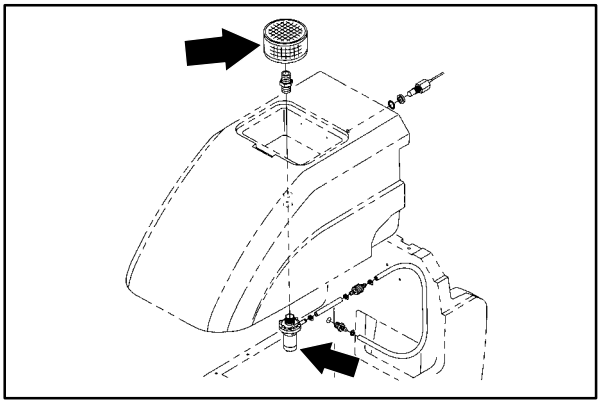
6. To install the vacuum motor into the machine, reverse steps 1–3 in this section.

OPTIONAL EXTENDED SCRUB

The ES ™ system on the machine allows the dirty water in the recovery tank to be filtered and returned to the solution tank to be re–used. This greatly extends the amount of scrubbing that can be done on one fill up. The ES ™ system is activated by a switch on the instrument panel.

TO REPLACE THE ES™ PUMP

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake, Turn Off Machine And Remove Key.



1. Tilt the recovery tank up.

NOTE: Drain the recovery tank.

2. Un–plug the ES ™ pump from the main harness.
3. Loosen the worm drive clamp from the small outlet hose on the ES ™ pump. Remove the hose.
4. Remove the ES ™ pump from the tank by un–screwing it counter–clockwise.
5. Put water proof thread sealant on the threads of the new ES ™ pump.
6. Screw the new pump clockwise into the recovery tank. Tighten until the outlet tube points towards the back of the machine.
7. Re–connect the small water line and worm drive clamp to the ES ™ pump.
8. Re–connect the main wire harness to the new pump. See schematic in the ELECTRICAL section of this manual.
9. Close the recovery tank, operate the machine and check the ES ™ pump for proper operation.

OPTIONAL POWER WAND

The power wand uses the machine's vacuum and, solution systems. The power wand allows scrubbing of floors that are out of reach of the machine.

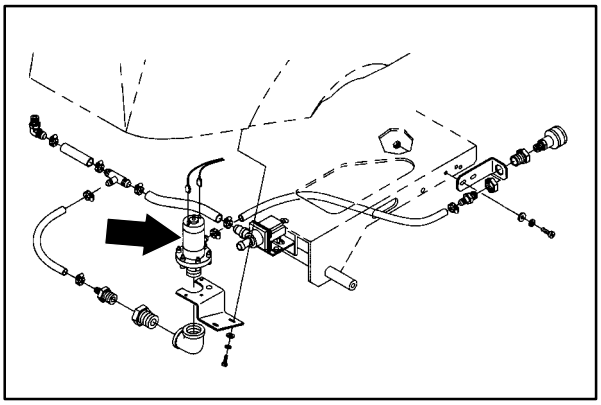
TO REPLACE POWER WAND PUMP

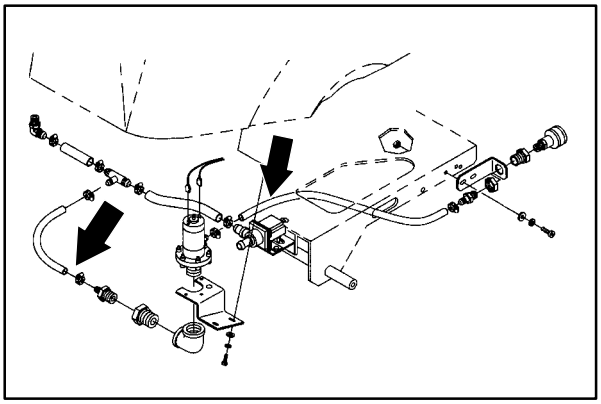
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Set Parking Brake, Turn Off Machine And Remove Key.

1. Tilt the recovery tank up.

NOTE: Drain the recovery tank.

2. Drain the solution tank.
3. Lower the scrub head.
4. Locate the power wand pump, up and behind the scrub brush motor.
5. Disconnect the pump from the main harness.
6. Loosen the worm drive clamp on the small hose going to the inlet side of the pump. This is the bottom fitting. Remove the hose.
7. Loosen the worm drive clamp on the small hose going to the outlet side of the pump. This is the top fitting. Remove the hose.
8. Remove the two M6 pan head screws holding the power wand pump mount bracket to the solution tank. Remove the pump and bracket from the machine.
9. Remove the three pan head screws holding the pump to the mount bracket. Remove the pump from the bracket. Note the orientation of the pump to the bracket.





10. Reinstall the mount bracket onto the new pump. Hand tighten the three pan head screws. Make sure the pump is orientated correctly.

11. Reinstall the pump and bracket to the solution tank. Tighten the two M6 pan head screws to 11 – 14 Nm (7 – 10 ft lb).

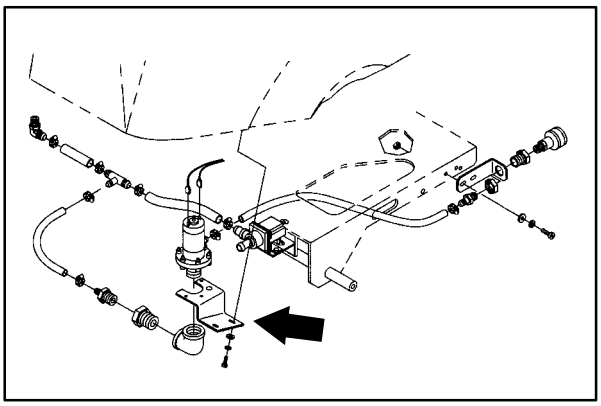
12. Re–connect the small hose to the inlet side of the pump. This is the bottom fitting.

13. Re–connect the small hose to the outlet side of the pump. This is the top fitting.

14. Re–connect the pump to the main harness. See schematic in the ELECTRICAL section of this manual.

15. Raise the scrub brush.

16. Fill the solution tank and check the power wand pump for proper operation.



MACHINE TROUBLESHOOTING

Problem	Cause	Remedy
Trailing water – poor or no water pickup	Worn squeegee blades	Rotate or replace squeegee blades
	Squeegee out of adjustment	Adjust squeegee
	Vacuum hose clogged	Flush vacuum hoses
	Recovery tank full	Drain recovery tank
	Vacuum fan will not turn on	Drain recovery tank
		Reset vacuum fan circuit breaker
	Debris caught on squeegee	Remove debris
	Foam filling recovery tank	Empty recovery tank; use less or change detergent
	Vacuum hose to squeegee or recovery tank disconnected or damaged	Reconnect or replace vacuum hose
	Recovery tank float screen clogged	Clean screen
	Recovery tank cover not closed completely	Close cover
Little or no solution flow to the floor	Solution tank empty	Fill solution tank
	Solution switch off	Turn switch on
	Solution control cable broken or out of adjustment	Replace and/or adjust cable
	Solution flow knob turn off	Turn solution flow knob on
	Solution supply lines plugged	Flush solution supply lines
	Solution solenoid clogged or stuck	Clean or replace
	ES™ mode: ES™ switch off	Turn ES™ switch on
Poor scrubbing performance	Debris caught on scrub brushes	Remove debris
	Improper detergent, brush, or pad used	Check with TENNANT representative for advice
	Worn scrub brush or pad	Replace scrub brush or pad
	Scrub brush motor circuit breaker tripped	Reset circuit breaker
		Adjust scrub brush down pressure, check with TENNANT representative for advice
	Low battery charge	Charge batteries
	Low scrub brush down pressure	Adjust scrub brush down pressure, check with TENNANT representative for advice

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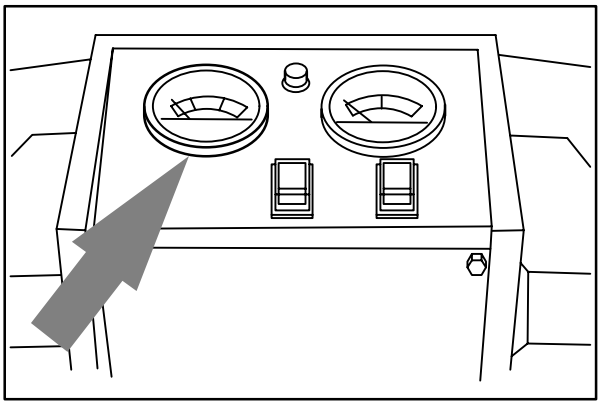
ELECTRICAL SYSTEM

The machine electrical system consists of the batteries, electrical drive motor, power control panel and related components. This section includes information on these components and their troubleshooting.

BATTERIES

The batteries are unique in that they hold their power for long periods of time. The lifetime of the batteries is limited by the number of charges the batteries receive. To get the most life from the batteries, charge them when the battery discharge indicator needle remains in the ***red*** zone of the indicator.



09743

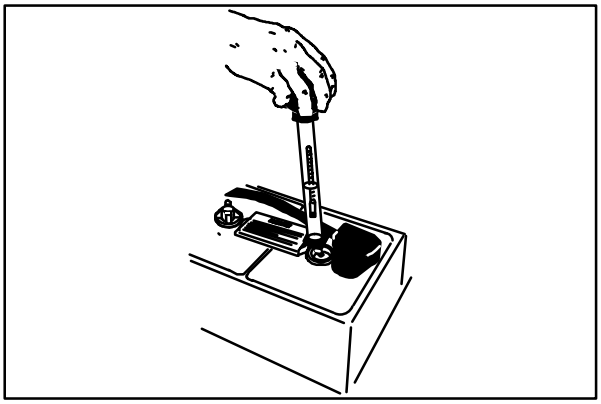
Periodically clean the top surface of the batteries and the terminals, and check for loose connections. Use a strong solution of baking soda and water. Brush the solution sparingly over the battery tops, terminals, and cable clamps. Do not allow any baking soda solution to enter the batteries. Use a wire brush to clean the terminal posts and the cable connectors. After cleaning, apply a coating of clear battery post protectant to the terminals and the cable connectors. Keep the tops of the batteries clean and dry.

Keep all metallic objects off the top of the batteries, which may cause a short circuit. Replace any worn or damaged wires.

Never add acid to the batteries, only distilled water. Always keep the battery caps on, except when adding water or taking hydrometer readings.

Measuring the specific gravity using a hydrometer is a way to determine the charge level, and condition of the batteries. If one or more of the battery cells test lower than the other battery cells (0.050 or more), the cell is damaged, shorted, or is about to fail.

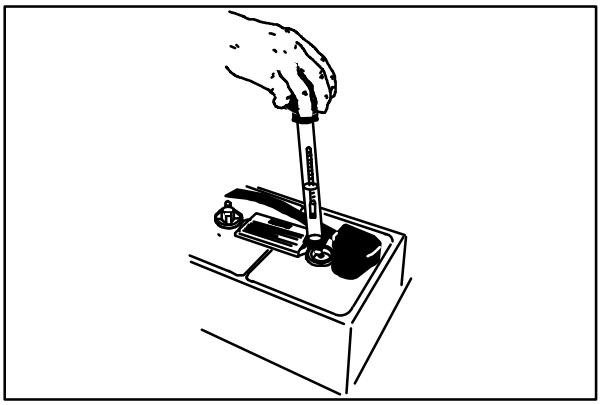
NOTE: Do not take readings immediately after adding distilled water. If the water and acid are not thoroughly mixed, the readings may not be accurate. Check the hydrometer readings against the following chart to determine the remaining battery charge level:



04380

SPECIFIC GRAVITY at 27° C (80° F)	BATTERY CHARGE
1.265	100% Charged
1.223	75% Charged
1.185	50% Charged
1.148	25% Charged
1.110	Discharged

NOTE: If the readings are taken when the battery electrolyte is any temperature other than 27° C (80° F), the reading must be temperature corrected. Add or subtract to the specific gravity reading 0.004, 4 points, for each 6° C (10° F) above or below 27°C (80° F).



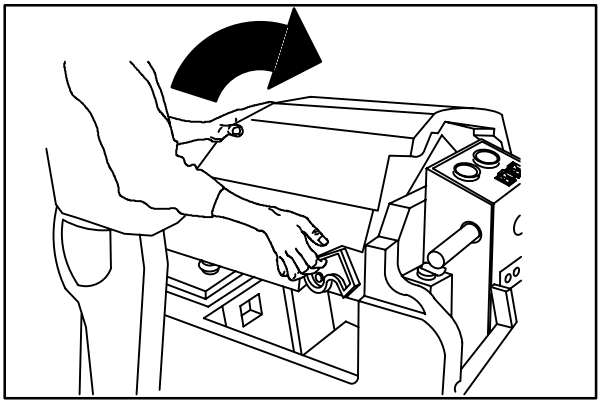
04380

TO CHARGE THE BATTERIES

1. Drive the machine to a flat, dry surface in a well-ventilated area.

2. Turn the machine power off and set the parking brake if your machine has this option.

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.



09511

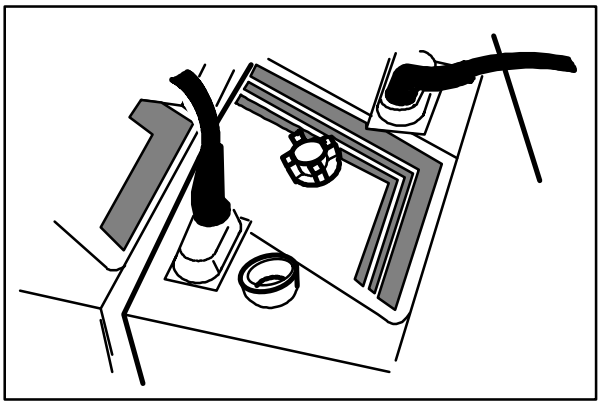
3. Lift up the recovery tank to get access to the batteries.

NOTE: The recovery tank must be empty.

4. Check the water level in all the battery cells. If the level is low, add just enough distilled water to cover the plates. DO NOT OVERFILL. The batteries can overflow during charging due to expansion.

NOTE: Make sure the battery caps are in place while charging.

FOR SAFETY: When Maintaining or Servicing Machine, Avoid Contact With Battery Acid.

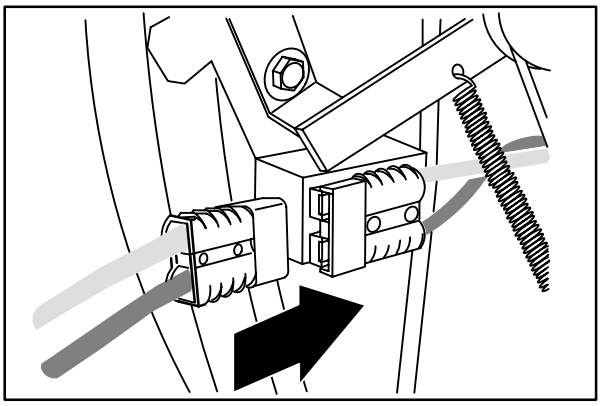


00879

5. Plug the charger connector into the battery connector.

WARNING: Batteries Emit Hydrogen Gas. Explosion Or Fire Can Result. Keep Sparks And Open Flame Away. Keep Covers Open When Charging.

6. Plug the battery charger into the wall outlet.

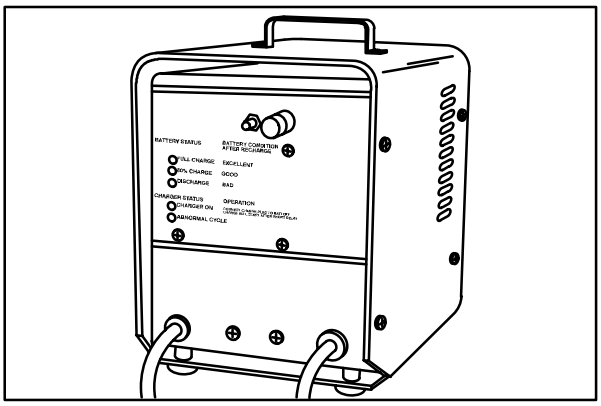


09520

NOTE: If the red "ABNORMAL CYCLE" lamp lights when the optional TENNANT charger is plugged into a wall outlet, the charger can not charge the battery, and there is something wrong with the battery.

7. The optional TENNANT charger will start automatically. When the batteries are fully charged, the optional TENNANT charger will automatically turn off.

8. After the charger has turned off, unplug the charger from the wall outlet.



07224

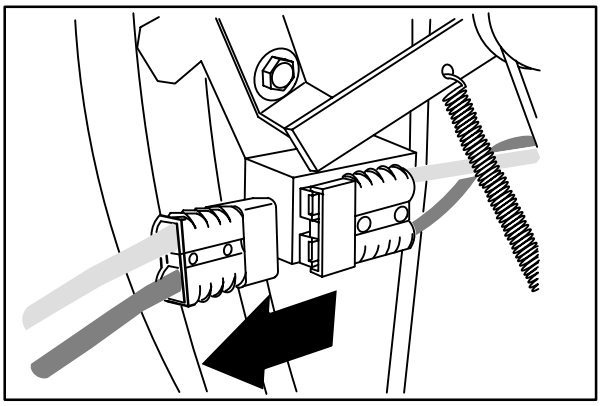
9. Unplug the charger connector from the battery connector on the machine.

FOR SAFETY: When Maintaining or Servicing Machine, Avoid Contact With Battery Acid.

10. Check the electrolyte level in each battery cell. Add just enough distilled water to bring the electrolyte level up to the fill rings.

11. Lower the recovery tank.

12. Rotate the stop arm out of the way to allow the recovery tank to close completely.



09521

INSTRUMENT PANEL

The instrument panel contains the electrical controls needed to operate the machine. The battery meter, brush pressure gauge, rocker switches, relays, contactor, and fuses are located on the panel. By removing the attachment hardware, the panel can be pulled back to access these components.

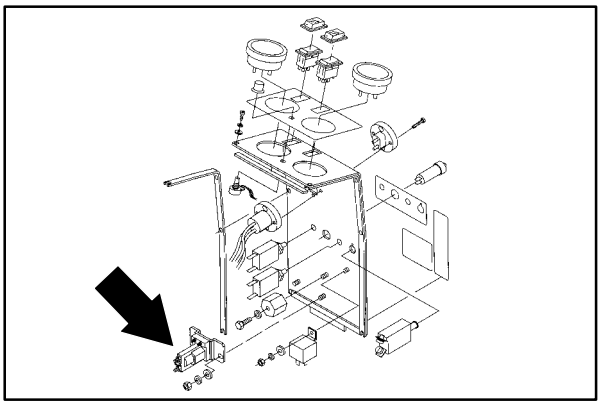
TO REMOVE THE INSTRUMENT PANEL

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

FOR SAFETY: Disconnect the battery connections before working on the machine.

1. Remove the panels eight phillips head mounting screws. In order to tilt the panel back enough to access the components, the two wires attached to the micro switch next to the handle gear and hub assembly, must be disconnected.

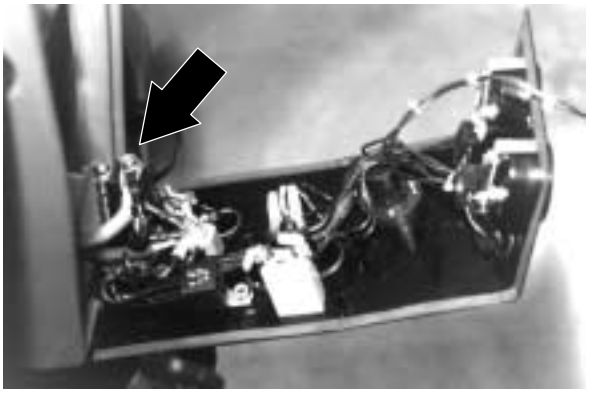
2. When reinstalling the panel, reconnect all wires that were disconnected. Install the eight phillips head mounting screws. DO NOT over tighten the screws or damage to the female brass insert could occur.



TO REPLACE BRUSH MOTOR CONTACTOR

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

FOR SAFETY: Disconnect the battery connections before working on the machine.



1. Disconnect all wires attached to the contactor using a 1/2 inch and a 3/8 inch wrench. Using a 7/16 inch wrench remove the contactor from the panel.

2. When installing the replacement contactor, DO NOT over tighten the wire connections on the contactors post or damage may occur.

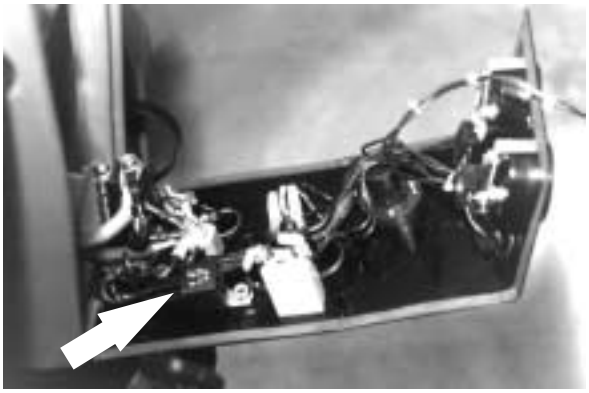
TO REPLACE VACUUM FAN RELAY

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

FOR SAFETY: Disconnect the battery connections before working on the machine.

1. Remove the nut that mounts the relay to the panel using a 7/16 inch wrench. With the relay off of the panel pull off the wire harness boot connection.

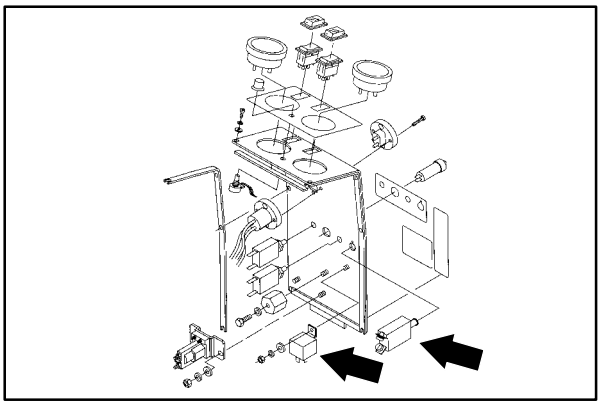
2. When installing the replacement relay, install the harness boot connection to the relay first and than remount to the panel.



TO REPLACE BRUSH OR VACUUM FAN MOTOR CIRCUIT BREAKERS

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

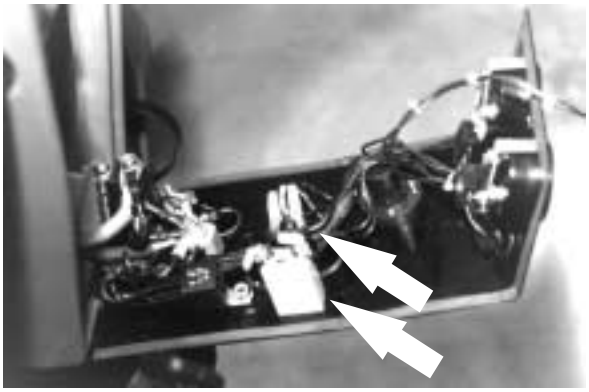
FOR SAFETY: Disconnect the battery connections before working on the machine.



1. Loosen and remove the breakers mounting nut located on the front side of the switch panel, using a 9/16 inch wrench and a pair of pliers.

2. Push the breaker through its mounting hole and remove both wires connected to it. On the 35 Amp brush motor breaker it is necessary to use a screw driver to disconnect the wires.

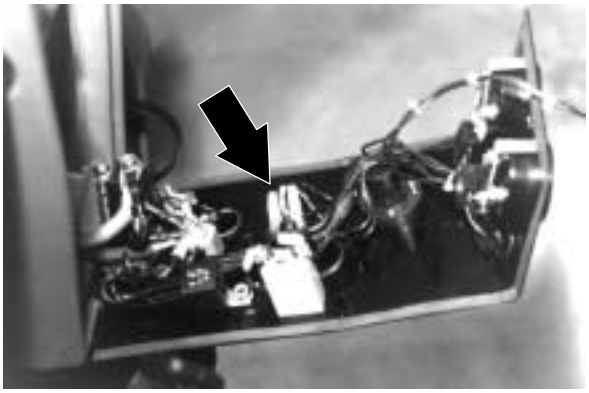
3. After connecting the two wires to the replacement breaker, install the breaker to the panel. DO NOT over tighten the mounting nut or damage may occur to the breaker.



TO REPLACE MAIN CIRCUIT BREAKERS

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

FOR SAFETY: Disconnect the battery connections before working on the machine.

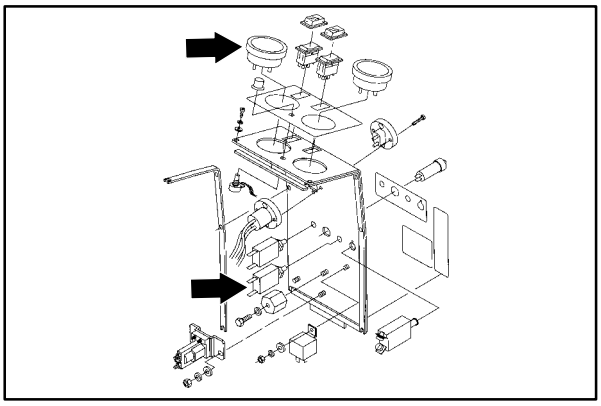


1. Disconnect the wires from the circuit breaker.
2. Carefully pry the retaining clip off the backside of the breaker using a straight screwdriver.
3. With the replacement breaker properly positioned into its location on the panel, side the new retaining clip securely into position.
4. Reconnect the wires to the circuit breaker. See schematic in this section.

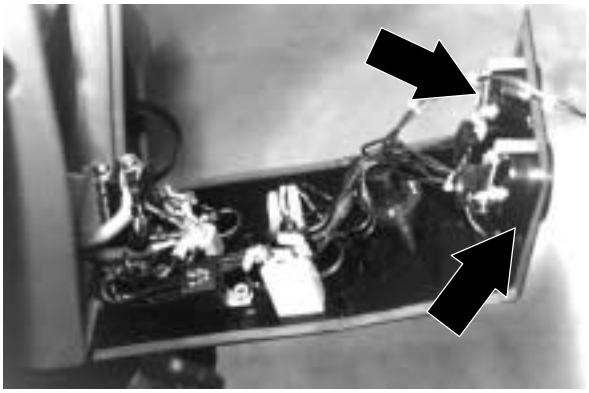
TO REPLACE BRUSH PRESSURE AND AMP GAUGE

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

FOR SAFETY: Disconnect the battery connections before working on the machine.



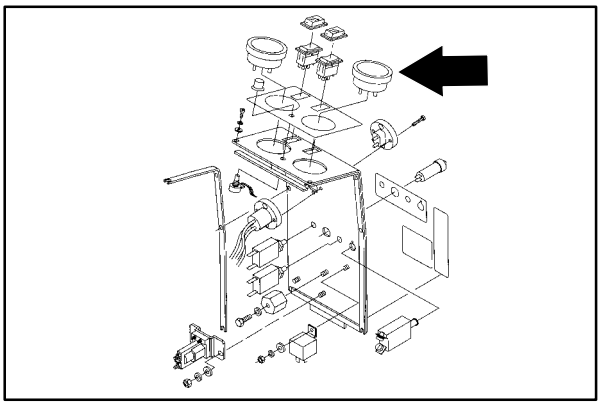
1. Disconnect wires 8 and 10 from the two terminal studs on the back of the gauge using a 5/16 inch wrench.
2. Remove the two nuts that secure the gauges mounting bracket against the panel, using a 5/16 inch wrench.
3. When installing the replacement gauge, position the gauge properly into its location on the panel and connect wire 8 and 10 to the two terminal studs. DO NOT over tighten the wire connections or damage may occur to the gauge.
4. With the gauge properly positioned, install the mounting bracket to the back of the gauge and snug down the two nuts that hold the gauge in place.



TO REPLACE BATTERY VOLTAGE METER

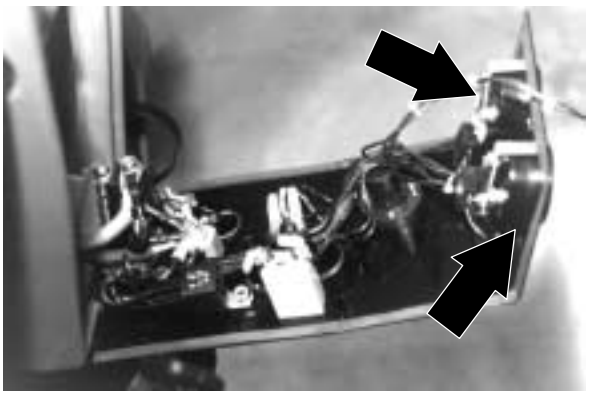
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

FOR SAFETY: Disconnect the battery connections before working on the machine.



1. Disconnect wires 9 and 17 from the positve terminal, and wires 3, 28, 34, and 38 from the negative terminal on the back of the gauge using a 5/16 inch wrench.

2. Remove the two nuts that secure the gauges mounting bracket against the panel, using a 5/16 inch wrench.



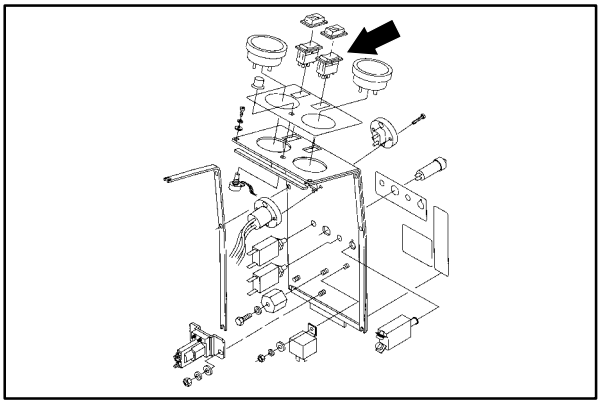
3. When installing the replacement gauge, position the gauge properly into its location on the panel and connect wires 9 and 17 to the positve terminal, and wires 3, 28, 34, and 38 to the negative terminal on the back of the gauge using a 5/16 inch wrench. DO NOT over tighten the wire connections or damage may occur to the gauge.

4. With the gauge properly positioned, install the mounting bracket to the back of the gauge and snug down the two nuts that hold the gauge in place.

TO REPLACE MAIN POWER OR SOLUTION ROCKER SWITCH

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

FOR SAFETY: Disconnect the battery connections before working on the machine.



NOTE: When replacing a switch it is necessary to also replace the splash guard.

1. Disconnect the harness plug to the switch terminals. Note the switch terminal locations in the harness plug before disconnecting.

2. Squeeze the plastic clips on the back portion of the switch and push the switch out the front of the panel.

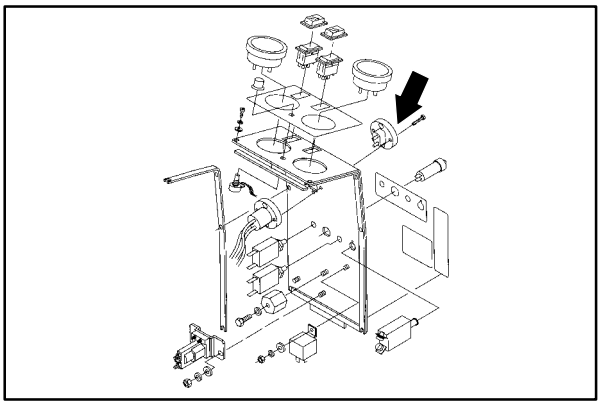
3. Spot glue a new splash guard to the replacement switch and push the switch into its proper position on the panel.

4. With the switch properly secured to the panel by its plastic clips, reconnect the harness plug to the switch terminals. Make sure the switch terminals are plugged into the correct slots on the harness plug. See schematic in this section.

TO REPLACE JUMPER PLUG

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

FOR SAFETY: Disconnect the battery connections before working on the machine.



1. Remove the two phillips head screws securing the jumper plug to the front of the panel.

2. Pull the plug out of its female harness connector.

3. Install the replacement jumper plug into the female harness connector on the panel.

4. Reinstall the two mounting screws.

5. Plug the harness back into the jumper plug.

TO REPLACE THE HANDLE BAR

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

FOR SAFETY: Disconnect the battery connections before working on the machine.

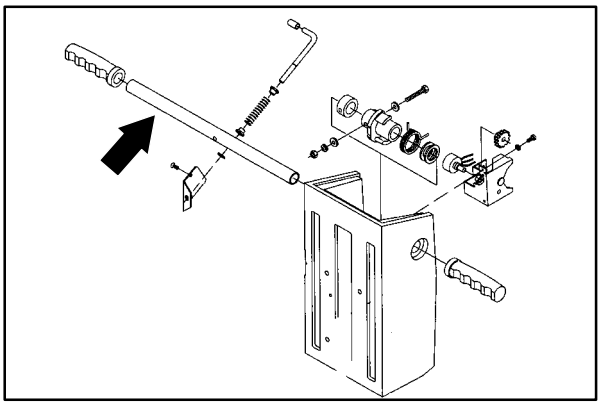
1. To remove the handlebar it is necessary to remove the right handle grip. This can be accomplished by plugging the hole in the left grip with your finger, and filling the handle bar with compressed air through the hole in the right grip.

2. Using a straight screwdriver loosen the set screw on the collar. The collar should move freely on the handlebar.

3. Remove the nut and bolt assembled through the gear and hub assembly using a 10mm wrench.

4. Pull the handlebar out of the left side of the console while sliding the gear and hub assembly and shims off the bar.

5. To reassemble, reverse the above procedure. When reinstalling the handle grips on to the handlebar, it is necessary to use either compressed air or liquid soap.

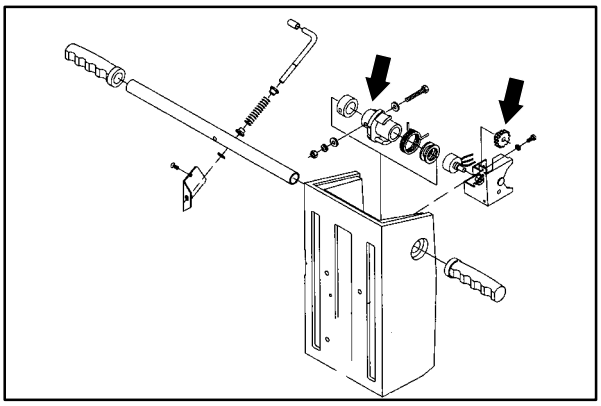


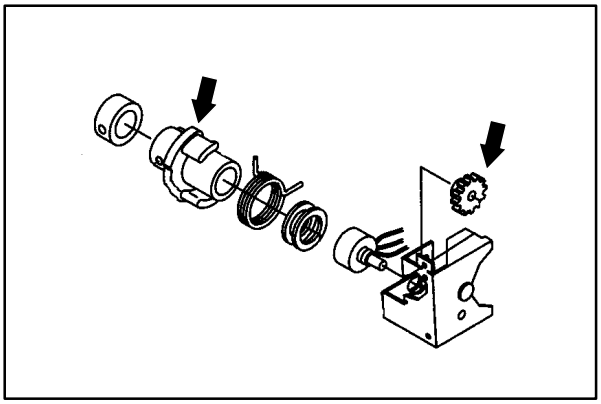
TO REPLACE GEAR AND HUB ASSEMBLY

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

FOR SAFETY: Disconnect the battery connections before working on the machine.

1. Follow steps 1–5 in TO REPLACE THE HANDLE BAR instructions. In this procedure it is not necessary to remove the left handle grip from the handlebar or pull the bar completely out of the console.

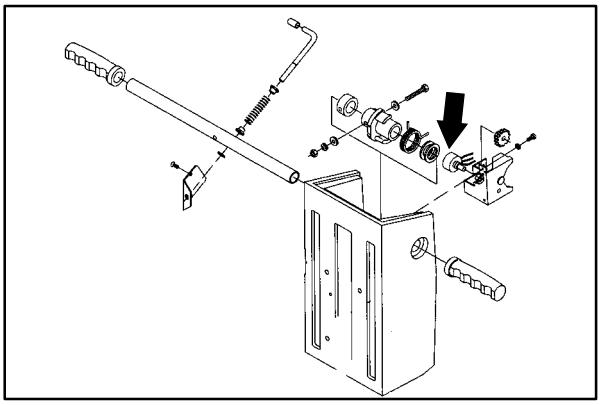




TO REPLACE THE POTENTIOMETER SWITCH

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

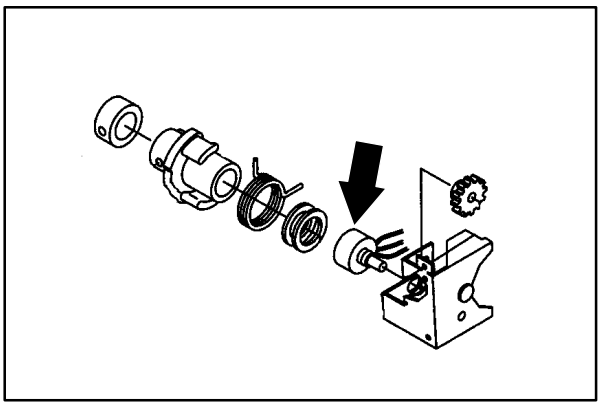
FOR SAFETY: Disconnect the battery connections before working on the machine.



1. Follow steps 1–5 in Section A (HANDLEBAR REPLACEMENT). In this procedure it is not necessary to remove the left handle grip from the handlebar.

2. Remove the three fasteners that mount the switch bracket to the console, using a phillips head screwdriver, 5/16 inch socket, and a 1/4 inch drive ratchet. Remove switch bracket with switch from console.

3. Using a 7/32 inch open-end wrench and a 7/32 inch socket, remove the switch from the bracket.



4. Install replacement switch onto the bracket. Only slightly snug down the switches mounting hardware, so that further adjustment of the switch can be achieved later.

5. Reinstall the switch bracket and switch back into the console

6. Reinstall the handlebar, gear and hub assembly, collar, etc., into the console. Install right handle grip using compressed air or soap to assist sliding the grip onto the bar.

7. Adjust switch so that the roller on the switch almost touches the neutral zone on the hub and gear assembly. Tighten down the switches mounting hardware. DO NOT over tighten the mounting hardware or damage to the switch may occur.

8. Test the switch operation for proper ON/OFF activation. The two wires to the switch should be connected to the switches two outside terminals. See schematic in this section.

TO REPLACE THE LATCH LEVER

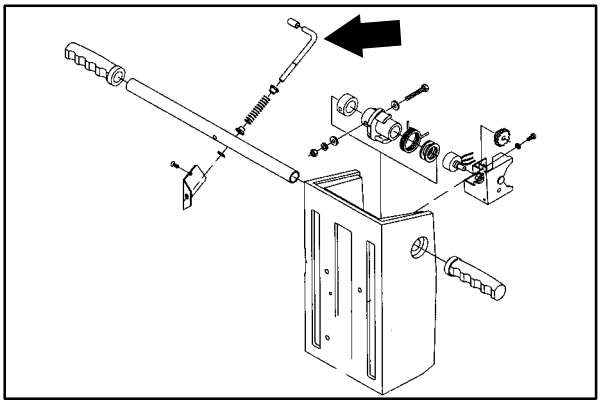
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

1. Remove the two allen head screws that mount the latch retainer plate to the console, using a 2.5 mm allen wrench.

2. Pull on the latch lever to release the plate from its location and remove the lever assembly.

3. To remove the spring and bushings from the lever, pop the retaining ring off the lever with a small straight screwdriver.

4. Reassemble the lever grip, bushings and spring to the replacement lever and install the retaining ring with a retaining ring tool.



5. Apply a small amount of multi-purpose grease to the end of the lever. This will help the lever seat into each adjustment hole location.

6. Using your fingers, squeeze the two bushings together and install the lever assembly back into its original position in the side of the console.

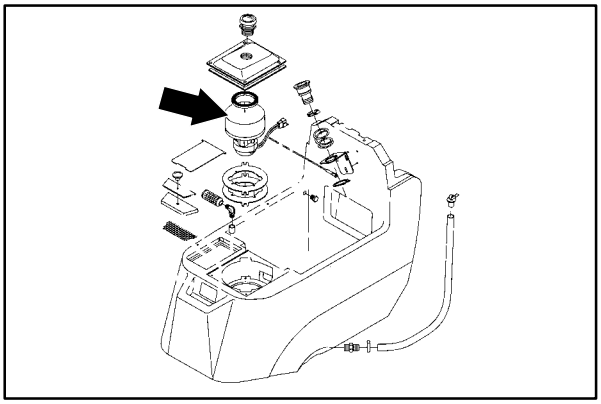
7. Install the latch retainer plate back into its location. Place the lever end through the hole in the retainer plate and reinstall the two allen head screws. Hand tighten.

ELECTRIC MOTORS

The carbon brushes on the vacuum fan motor, scrub brush motor, and propelling motor should be inspected after every 400 hours of machine operation.

TO REPLACE VACUUM FAN MOTOR BRUSHES

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.



1. Remove the vacuum fan from the machine. See TO REMOVE VACUUM FAN MOTOR instructions in the SCRUBBING section of this manual.

2. With the vacuum fan motor setting off to the side, out of its normal location, pry back the locking tabs and remove fans motor cover.

NOTE : DO NOT operate vacuum fan with the top cover removed.

3. Remove the two phillips head screws that hold the clamps and motor brushes in place.

NOTE: If the motor brushes measure 10 mm (0.375 in.) of an inch or less in length, install new brushes.

4. If motor brushes replacement is necessary, carefully pull the wire tab connection out of the brush mechanism using a needle nose pliers.

5. Install the wire tab connections into each one of the two replacement motor brush mechanisms.

6. Remount both motor brushes back into position using the phillips head screws and brush clamps.

7. Properly reposition and install the fan's motor cover, pushing down to lock into place.

8. Reinstall the vacuum fan motor assembly back into position. See TO INSTALL VACUUM FAN MOTOR instructions in the SCRUBBING section of this manual.

9. Plug the vacuum fan in and start the machine, checking for proper fan operation.

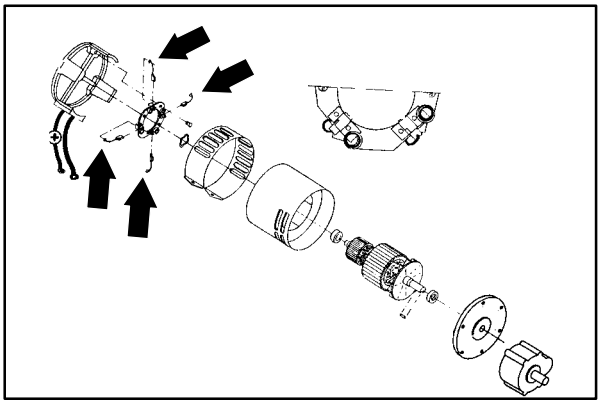
TO REPLACE SCRUB BRUSH MOTOR BRUSHES

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

1. Using a 10 mm wrench loosen the clamping hardware and remove the band from the top of the motor.

NOTE: The position of the bracket connected to the band is, centered between the motor leads.

2. To change the motor brushes, the motor must be partially disassembled. Mark the motor top and bottom to insure proper adjustment when reassembling.

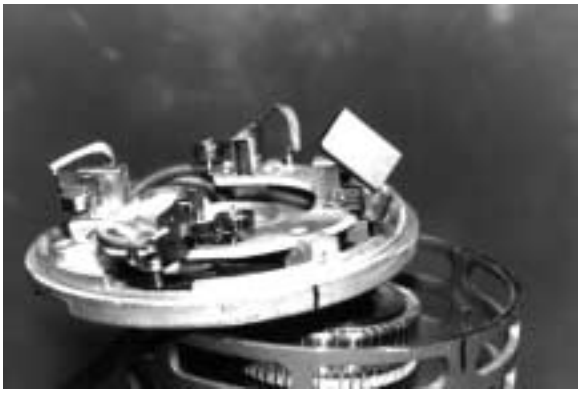


3. Using a 0.375 in. socket and ratchet, remove the two motor through bolts.

4. Using a hammer and straight screwdriver gently tap and pry the motor top off.

5. Change the motor brushes if worn to 10 mm (0.375) of an inch or less in length.

NOTE: When installing new motor brushes, do not push the brushes completely into the brush holder. Let the brush spring rest on the side of the brush. This will prevent the brushes from hitting the commutator during motor re–assembly. After the top of the motor is properly assembled, push the motor brushes completely into the brush holder using a small screwdriver. The brush springs should snap into position behind the brush. Line-up the marks on the motor and reassemble.



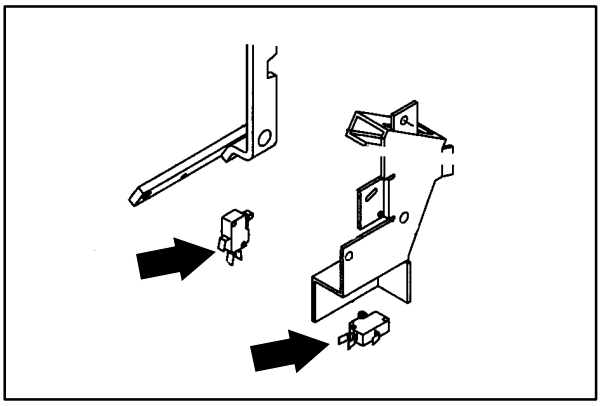
6. Reinstall the motor and scrub head assembly to the machine. See TO INSTALL SCRUB BRUSH MOTOR instructions in the SCRUBBING section of this manual.

TO REPLACE VACUUM FAN SWITCH

FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

1. Disconnect pick-up hose from squeegee.
2. Loosen the two thumb screws that secure the squeegee assembly to the machine, remove squeegee.
3. Place blocks under the squeegee attachment bracket to relieve tension on the squeegee lift cable.

NOTE: The squeegee lift arm should be in the unlatched position.



4. Remove the two phillips head mounting screws and the bolt that mounts the lift arm and bracket. Use a 13 mm socket and ratchet to remove the bolt.
5. Using a 7/32 inch socket and ratchet remove the switch from the bracket.
6. Install replacement switch and adjust.

NOTE: The switch should be adjusted so that when the lift arm is unlatched to allow the squeegee to sit on the floor, the arm activates the roller lever on the switch with moderate force. You will hear a click when the switch is activated. Improper adjustment of the switch will cause the lift arm to damage the switch.

7. Reassemble the bracket and lift arm assembly to the tank wall, reversing steps 1–4.

TO REPLACE CHARGER SWITCH

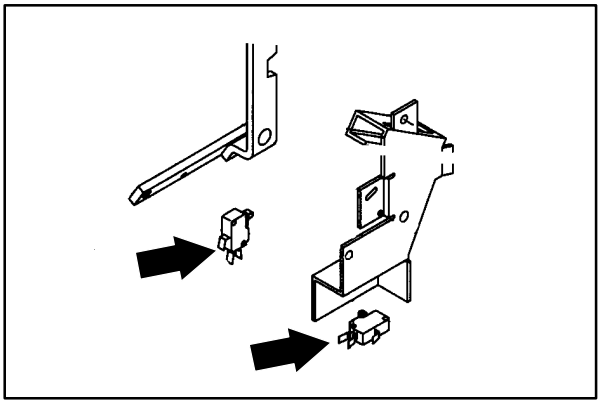
FOR SAFETY: Before Leaving Or Servicing Machine; Stop On Level Surface, Turn Off Machine.

1. Follow the steps 1–5 in TO REPLACE VACUUM FAN SWITCH instructions in this section.

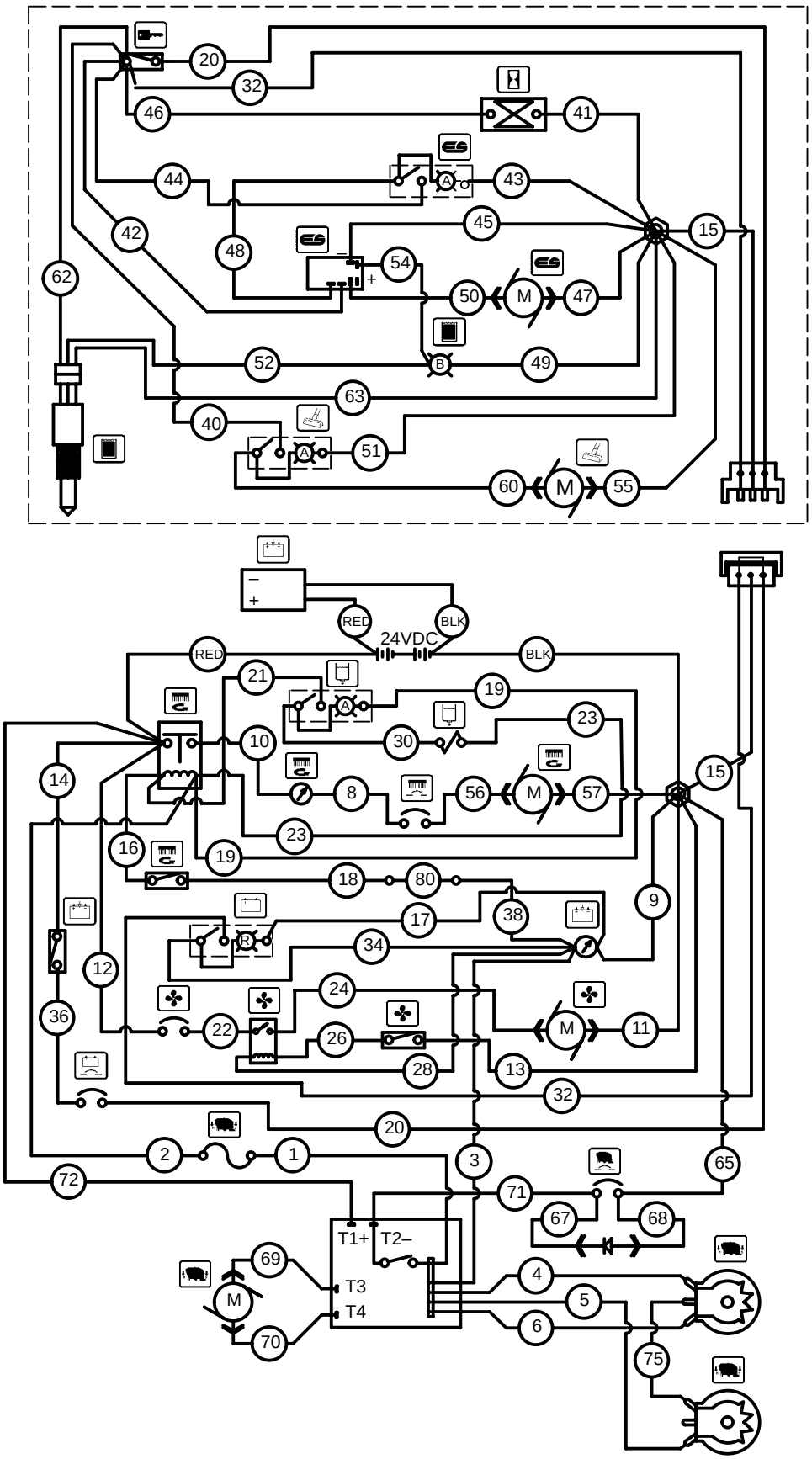
2. Install replacement switch and adjust.

NOTE: The switch should be adjusted so thatwhen the lift arm is unlatched to allow the squeegee to sit on the floor, the arm activates the roller lever on the switch with moderate force. You will hear a click when the switch is activated. Improper adjustment of the switch will cause the lift arm to damage the switch.

3. Reassemble the bracket and lift arm assembly to the tank wall, reversing steps 1–4 in TO REPLACE VACUUM FAN SWITCH instructions in this section.



Electrical Schematic



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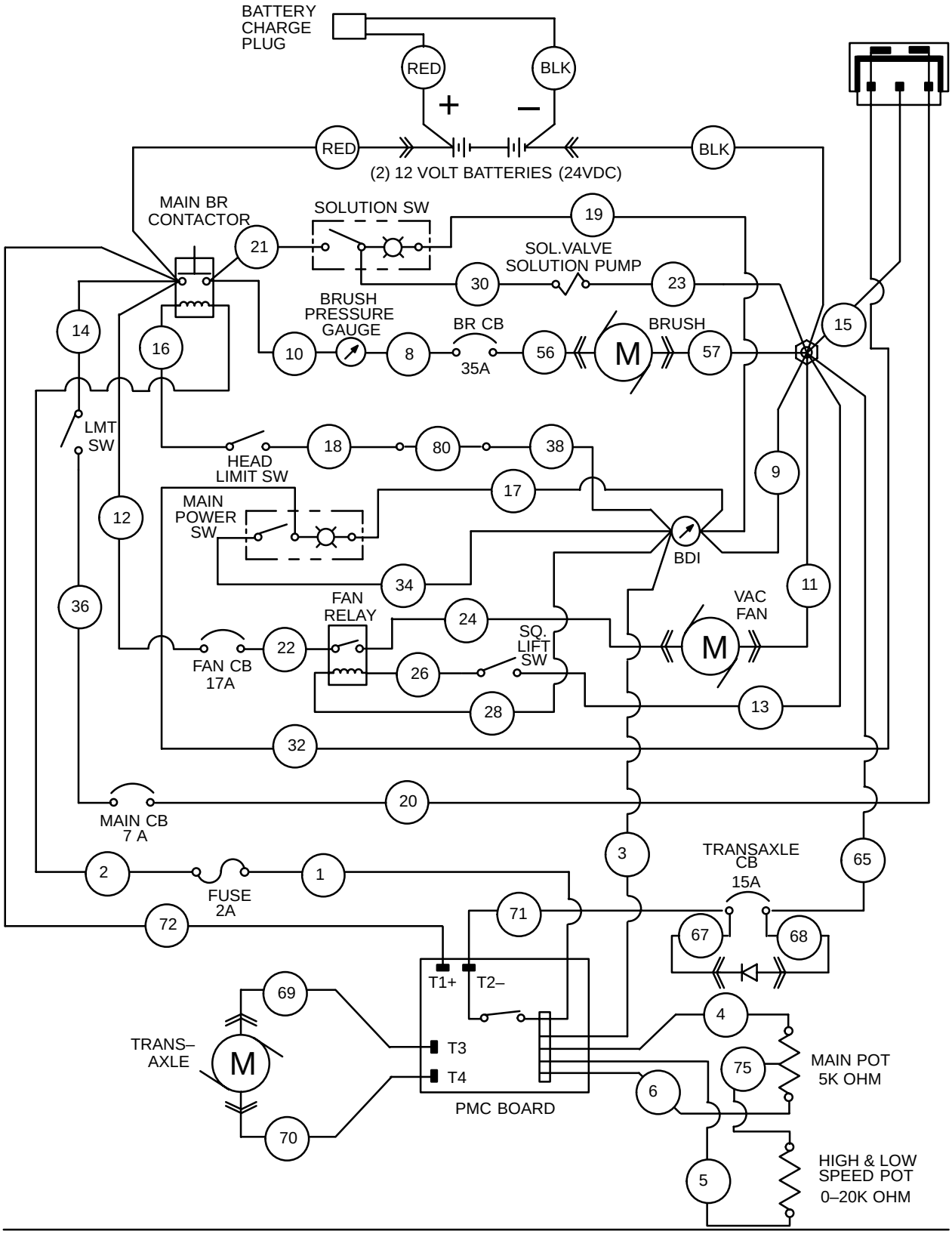
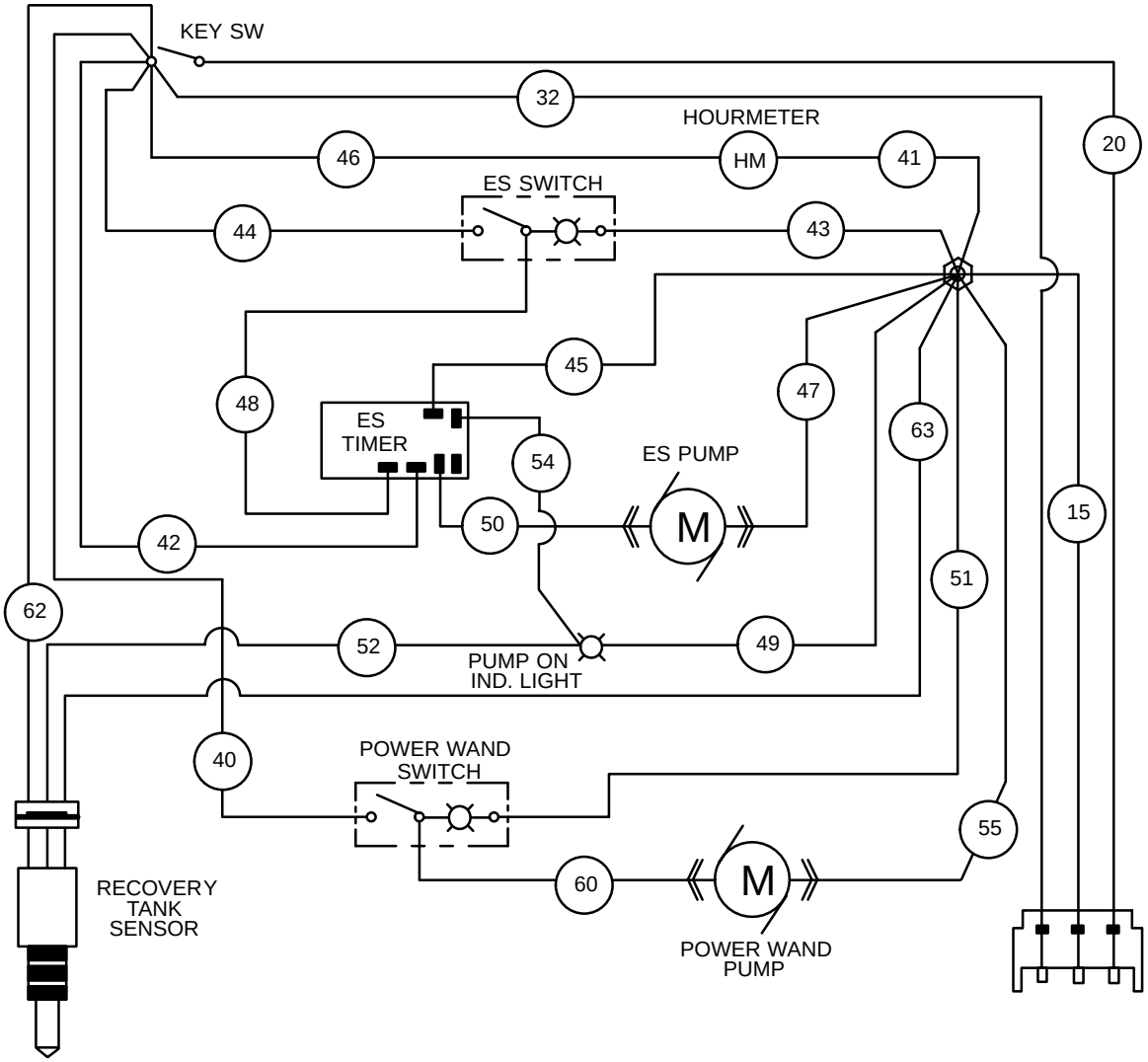
TROUBLESHOOTING

The troubleshooting charts that follow are organized so they lead you through the circuits.They include flow charts and instructions for you as to where to insert your test instruments.

5300 TRACTION DRIVE SCHEMATIC



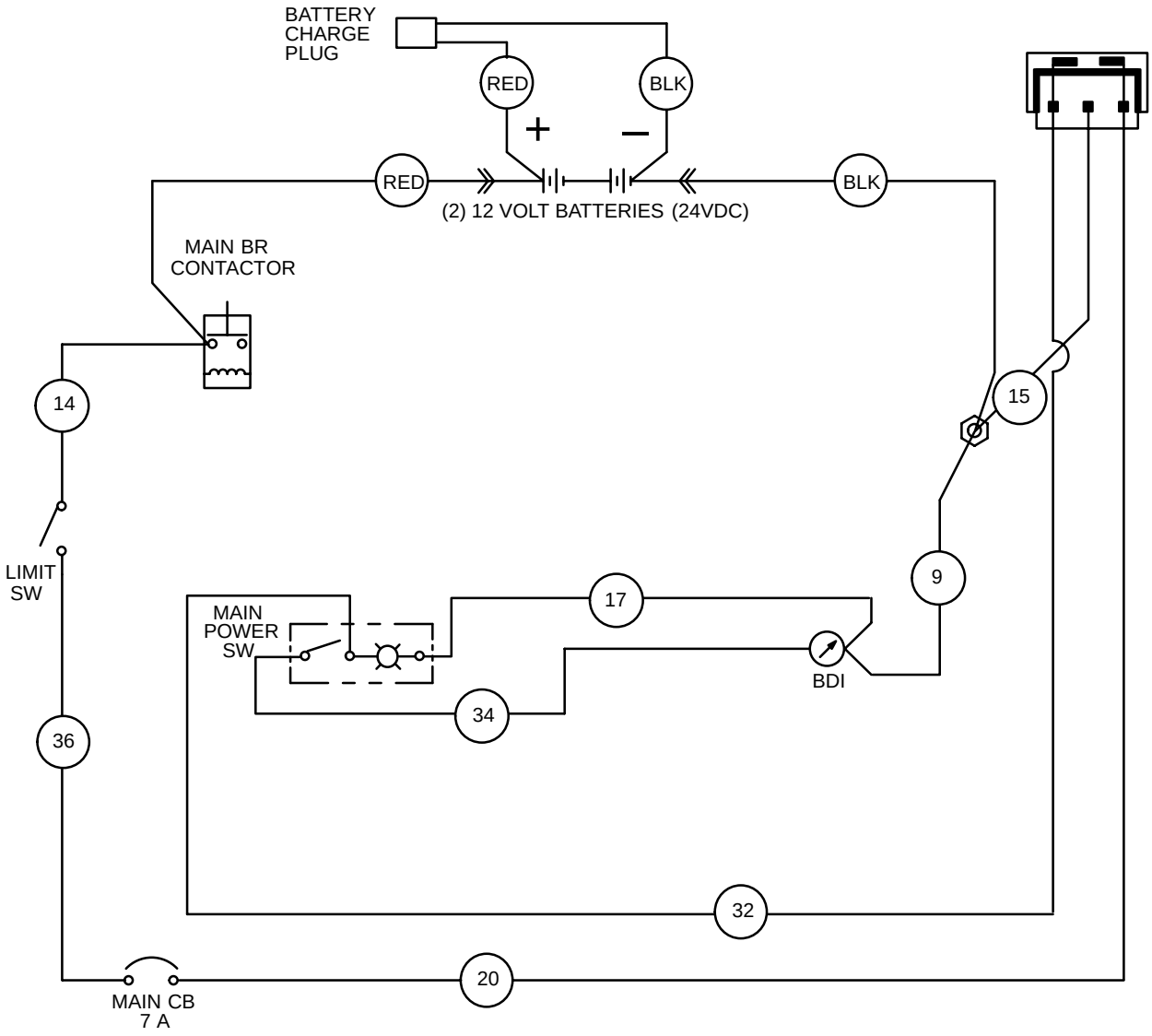
5300 OPTIONS SCHEMATIC



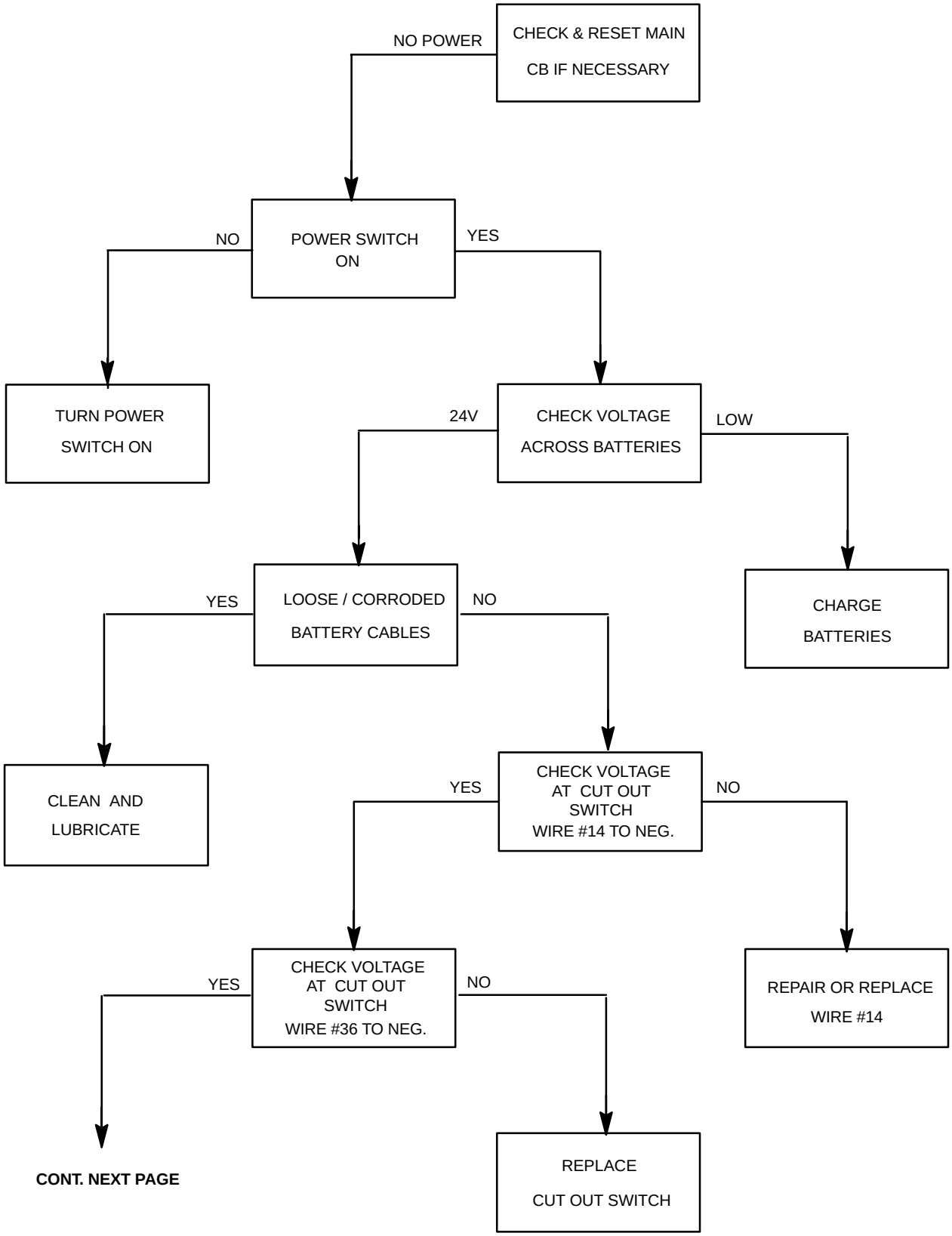
5 OPTION PACKAGES

1. **TOTAL OPTIONS**
2. **WAND PUMP ONLY**
3. **KEY SWITCH AND HOURMETER**
4. **KEY SWITCH, HOURMETER & ES**
5. **KEY SWITCH, HOURMETER & WAND PUMP**

POWER UP CIRCUIT



POWER UP FAILURE



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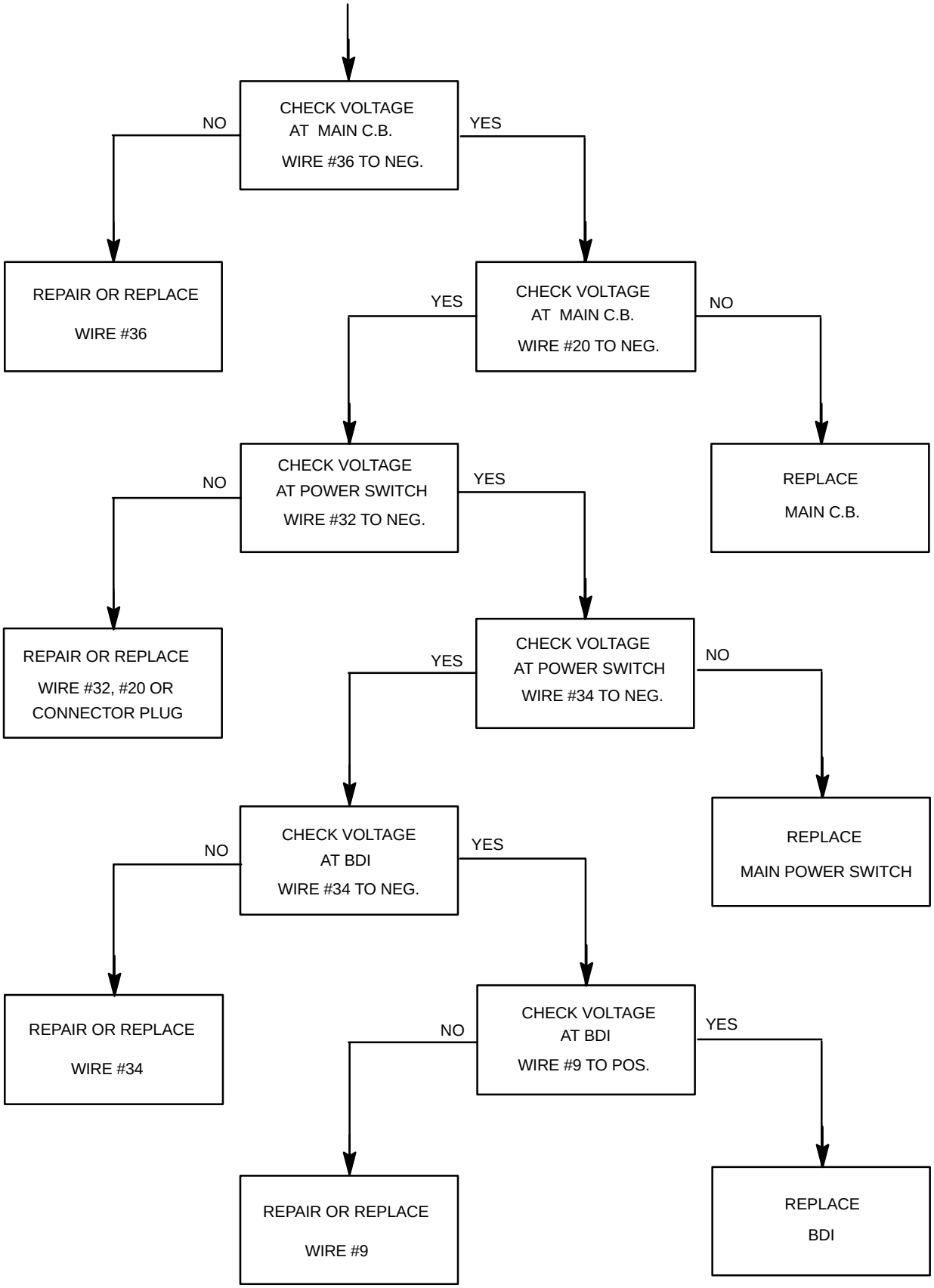
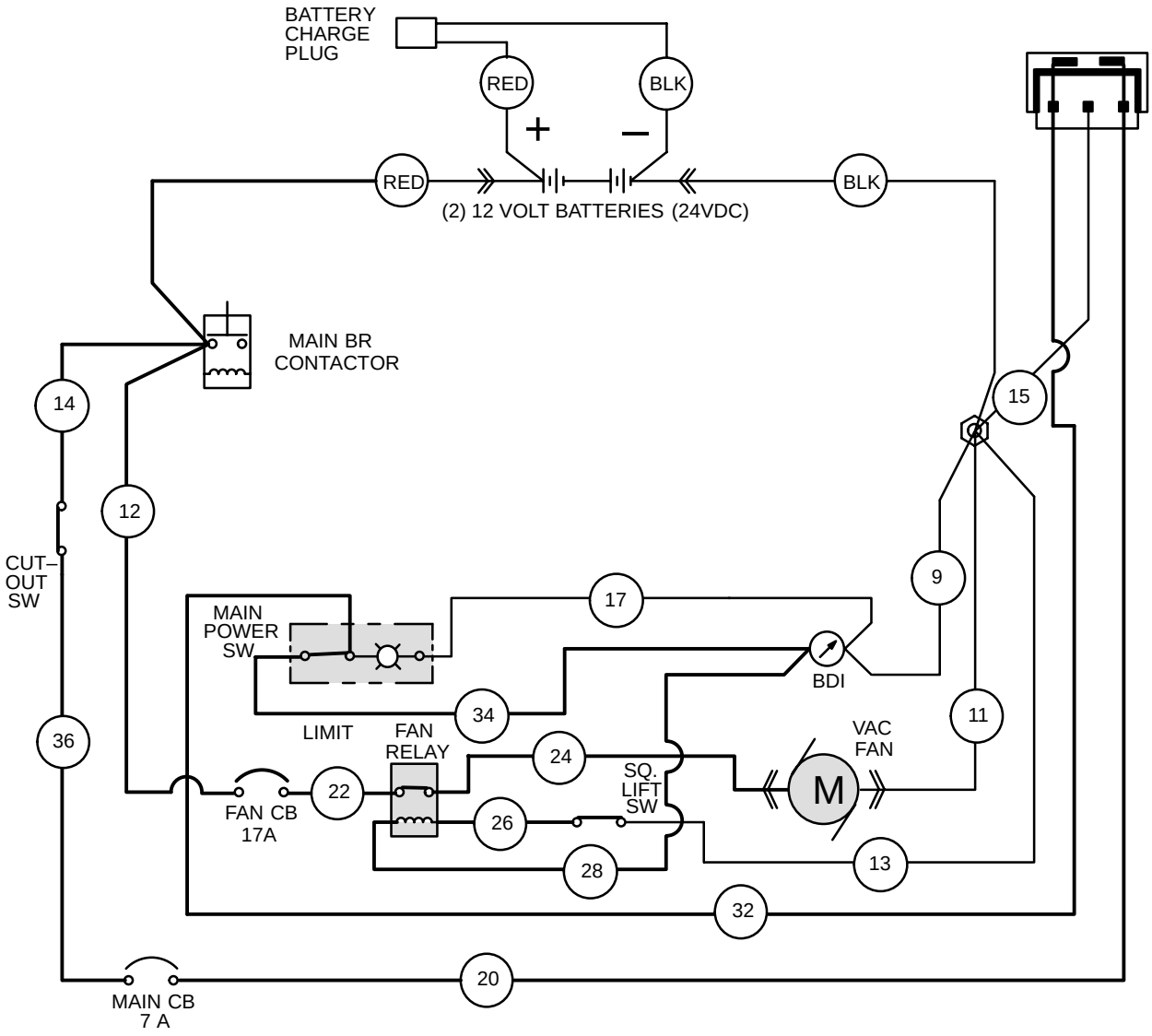
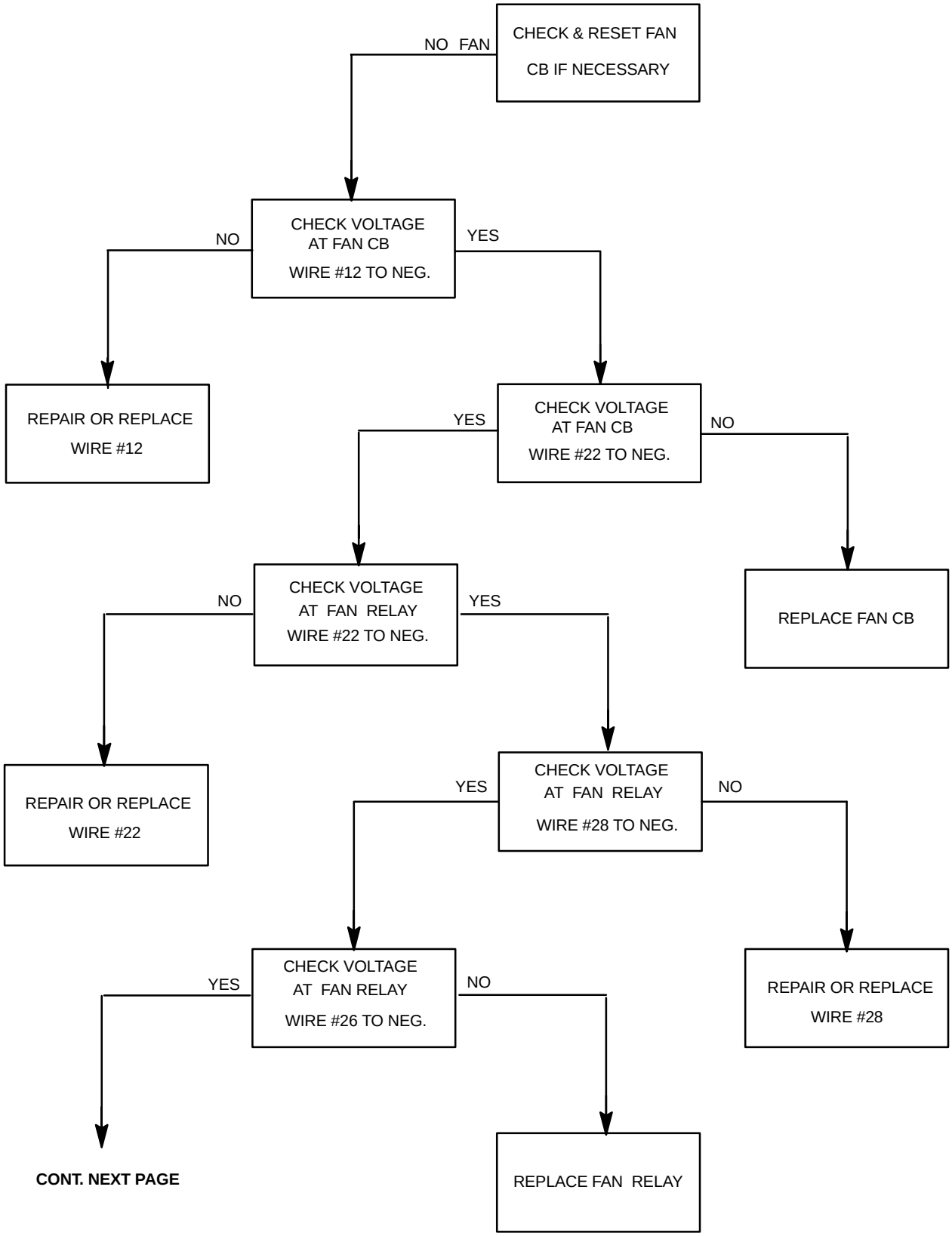
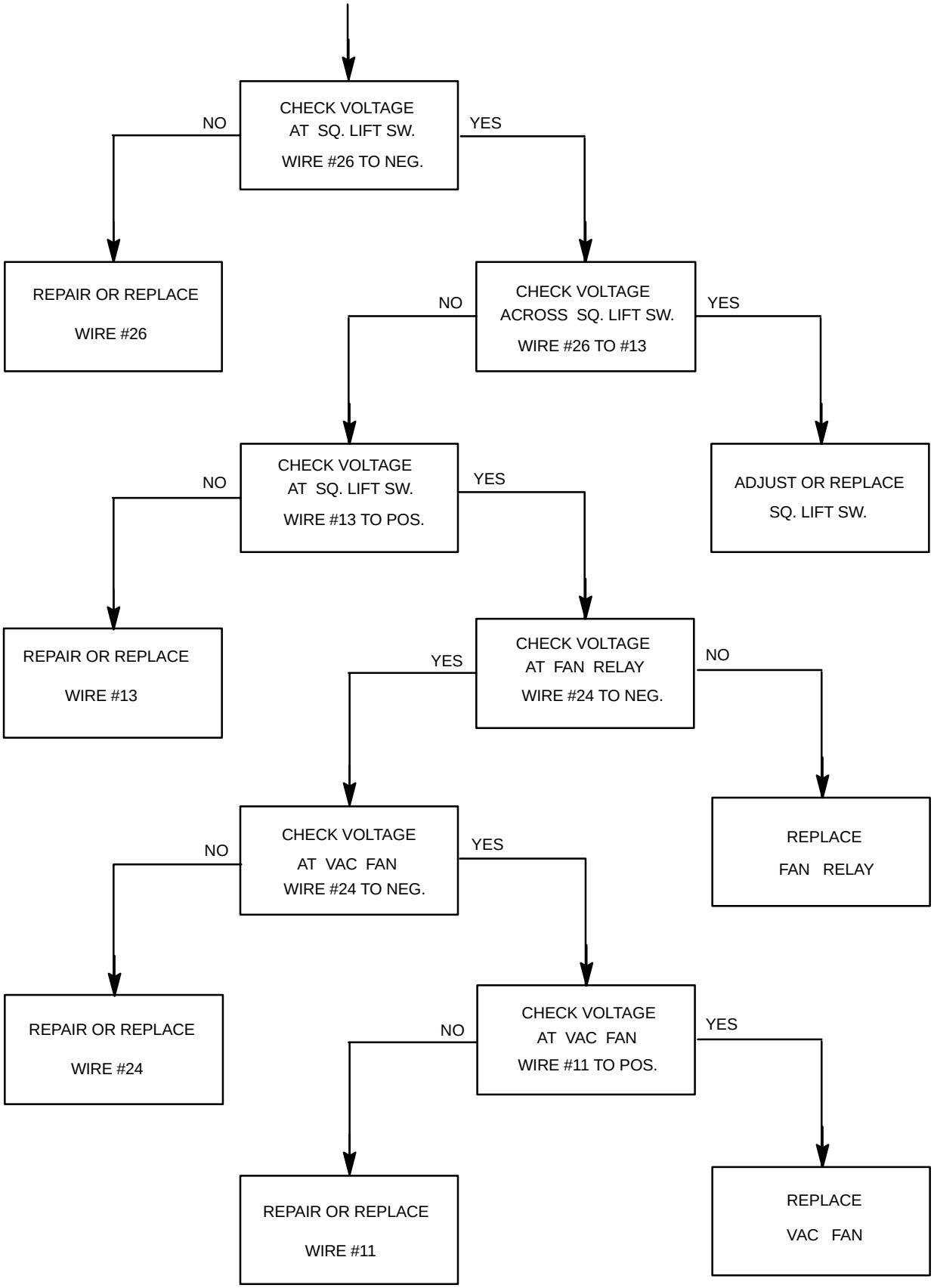

CHECK VOLTAGE AT MAIN C.B. WIRE #36 TO NEG.
NO
YES
REPAIR OR REPLACE WIRE #36
CHECK VOLTAGE AT MAIN C.B. WIRE #20 TO NEG.
YES
NO
CHECK VOLTAGE AT POWER SWITCH WIRE #32 TO NEG.
NO
YES
REPLACE MAIN C.B.
REPAIR OR REPLACE WIRE #32, #20 OR CONNECTOR PLUG
CHECK VOLTAGE AT POWER SWITCH WIRE #34 TO NEG.
YES
NO
CHECK VOLTAGE AT BDI WIRE #34 TO NEG.
NO
YES
REPLACE MAIN POWER SWITCH
REPAIR OR REPLACE WIRE #34
CHECK VOLTAGE AT BDI WIRE #9 TO POS.
NO
YES
REPAIR OR REPLACE WIRE #9
REPLACE BDI

VAC FAN CIRCUIT

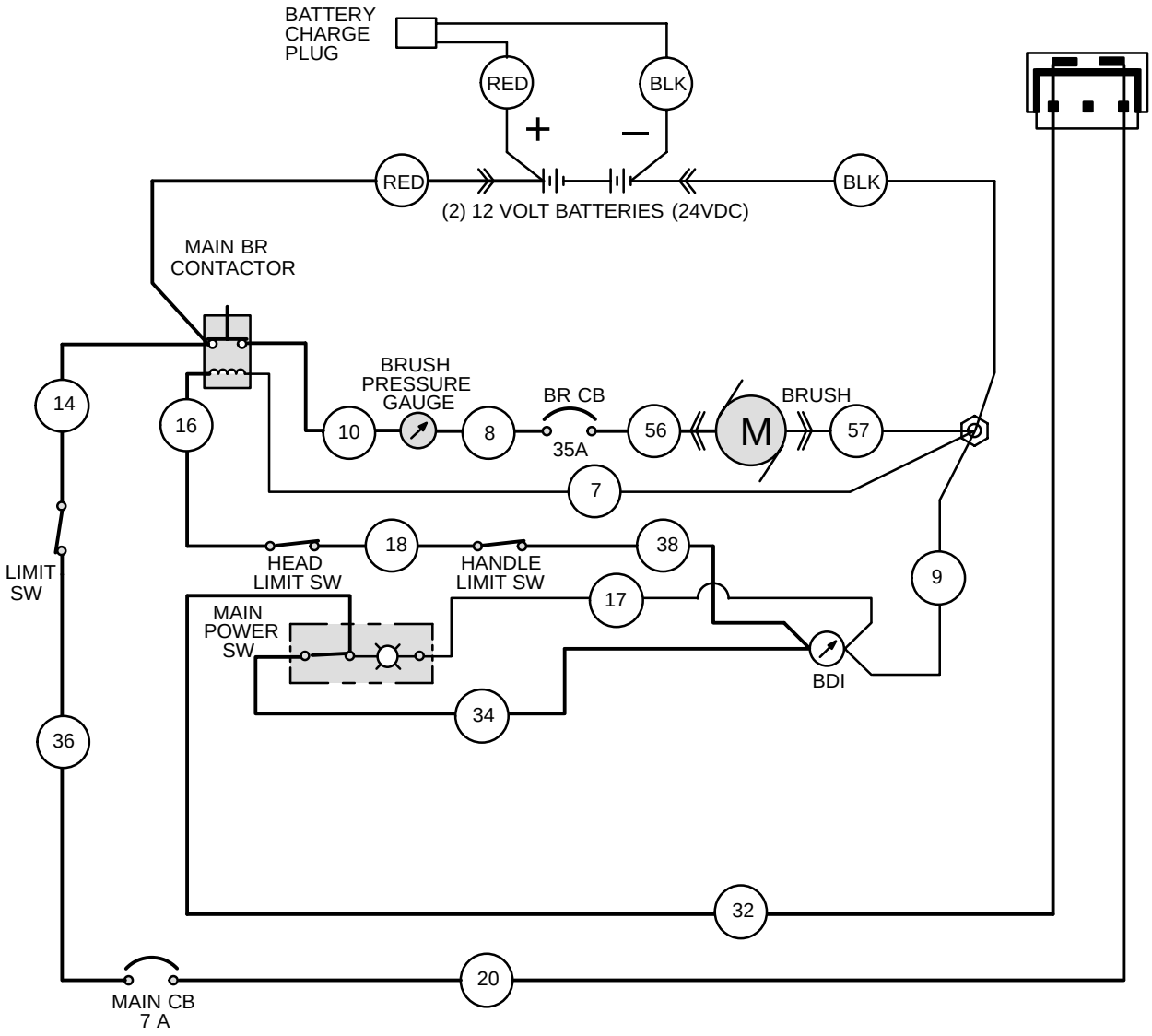


VACUUM FAN FAILURE

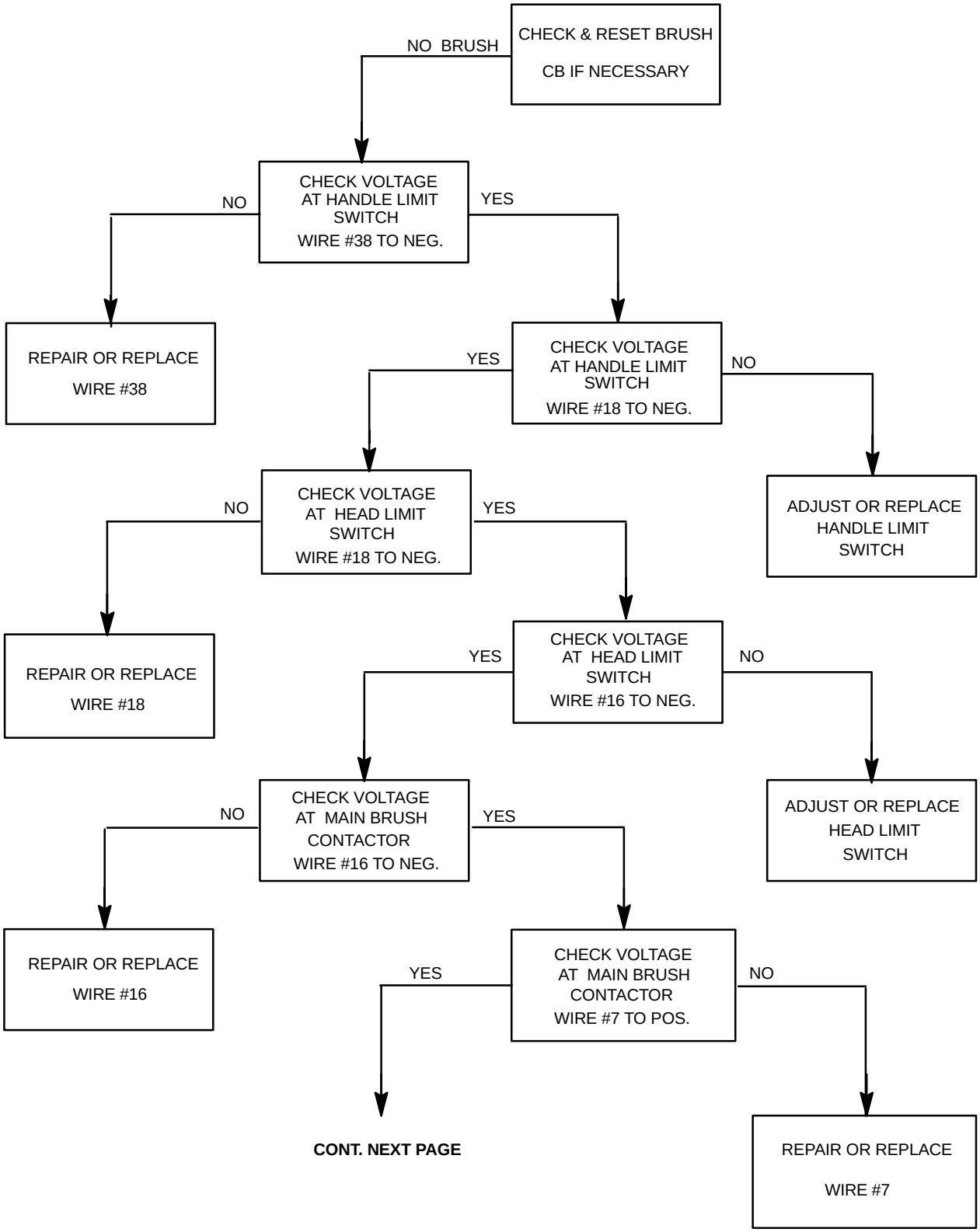


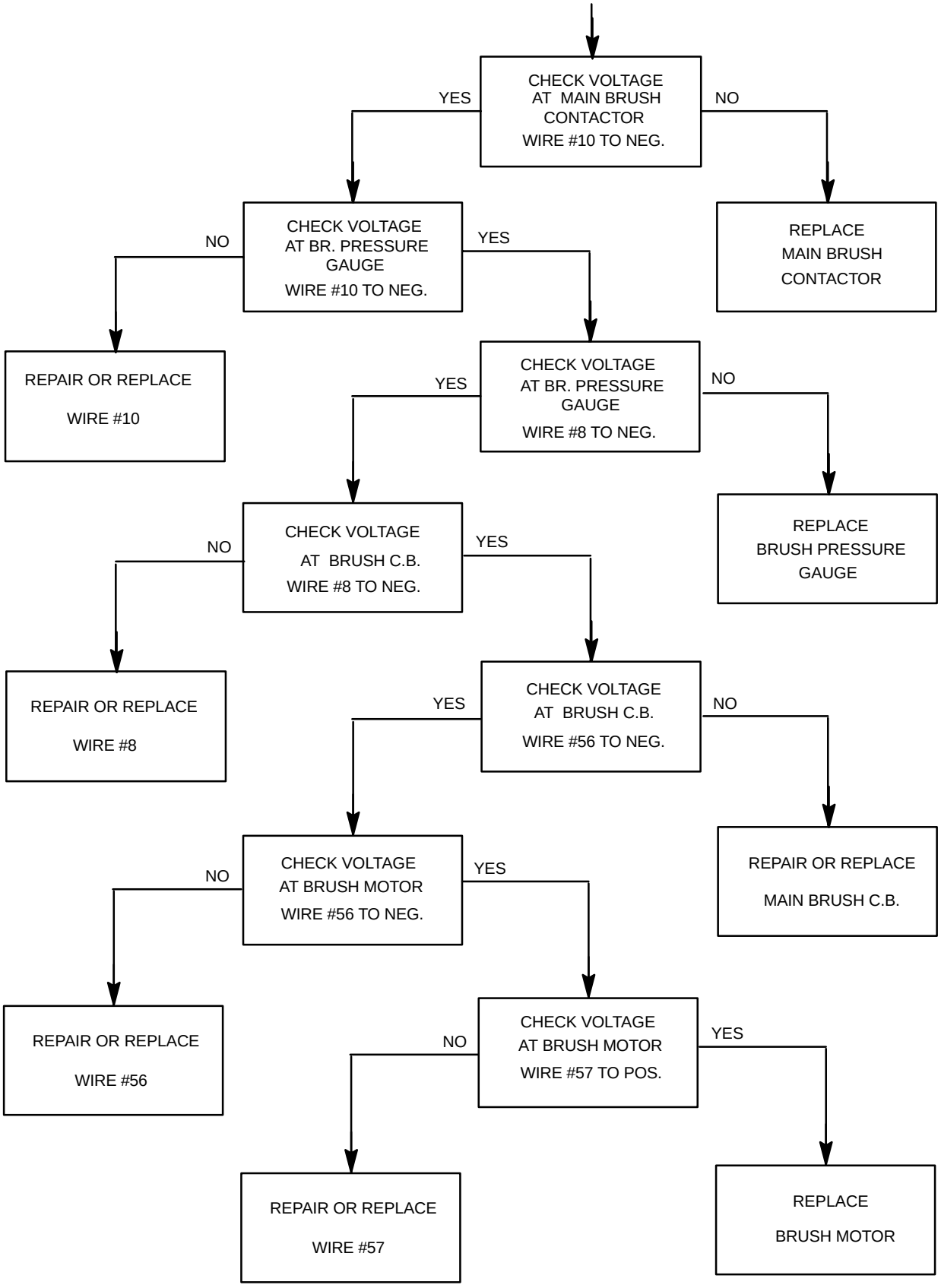

CHECK VOLTAGE
AT SQ. LIFT SW.
WIRE #26 TO NEG.
NO
YES
REPAIR OR REPLACE
WIRE #26
CHECK VOLTAGE
ACROSS SQ. LIFT SW.
WIRE #26 TO #13
NO
YES
CHECK VOLTAGE
AT SQ. LIFT SW.
WIRE #13 TO POS.
NO
YES
ADJUST OR REPLACE
SQ. LIFT SW.
REPAIR OR REPLACE
WIRE #13
CHECK VOLTAGE
AT FAN RELAY
WIRE #24 TO NEG.
YES
NO
CHECK VOLTAGE
AT VAC FAN
WIRE #24 TO NEG.
NO
YES
REPLACE
FAN RELAY
REPAIR OR REPLACE
WIRE #24
CHECK VOLTAGE
AT VAC FAN
WIRE #11 TO POS.
NO
YES
REPAIR OR REPLACE
WIRE #11
REPLACE
VAC FAN

MAIN BRUSH CIRCUIT

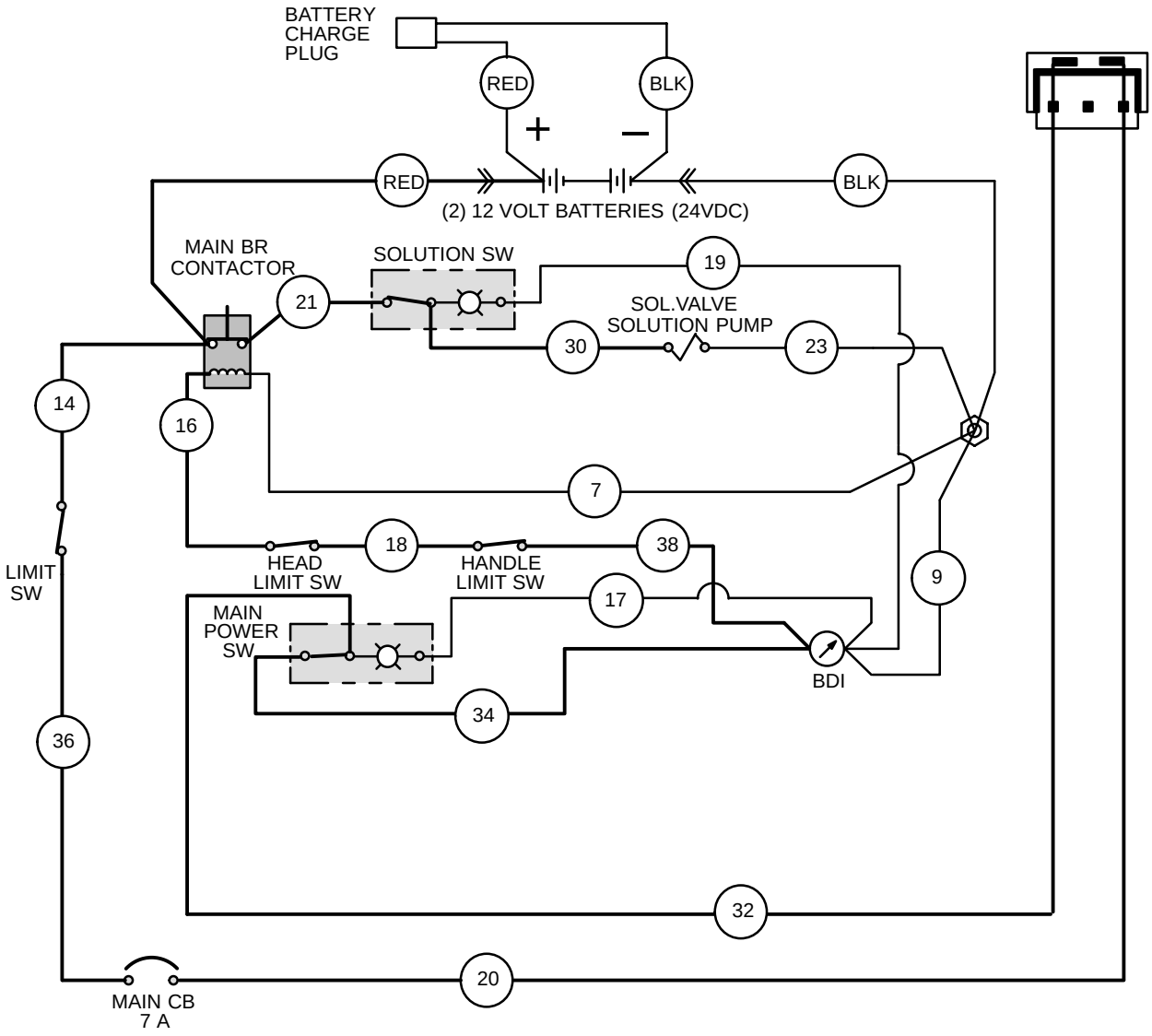


MAIN BRUSH FAILURE

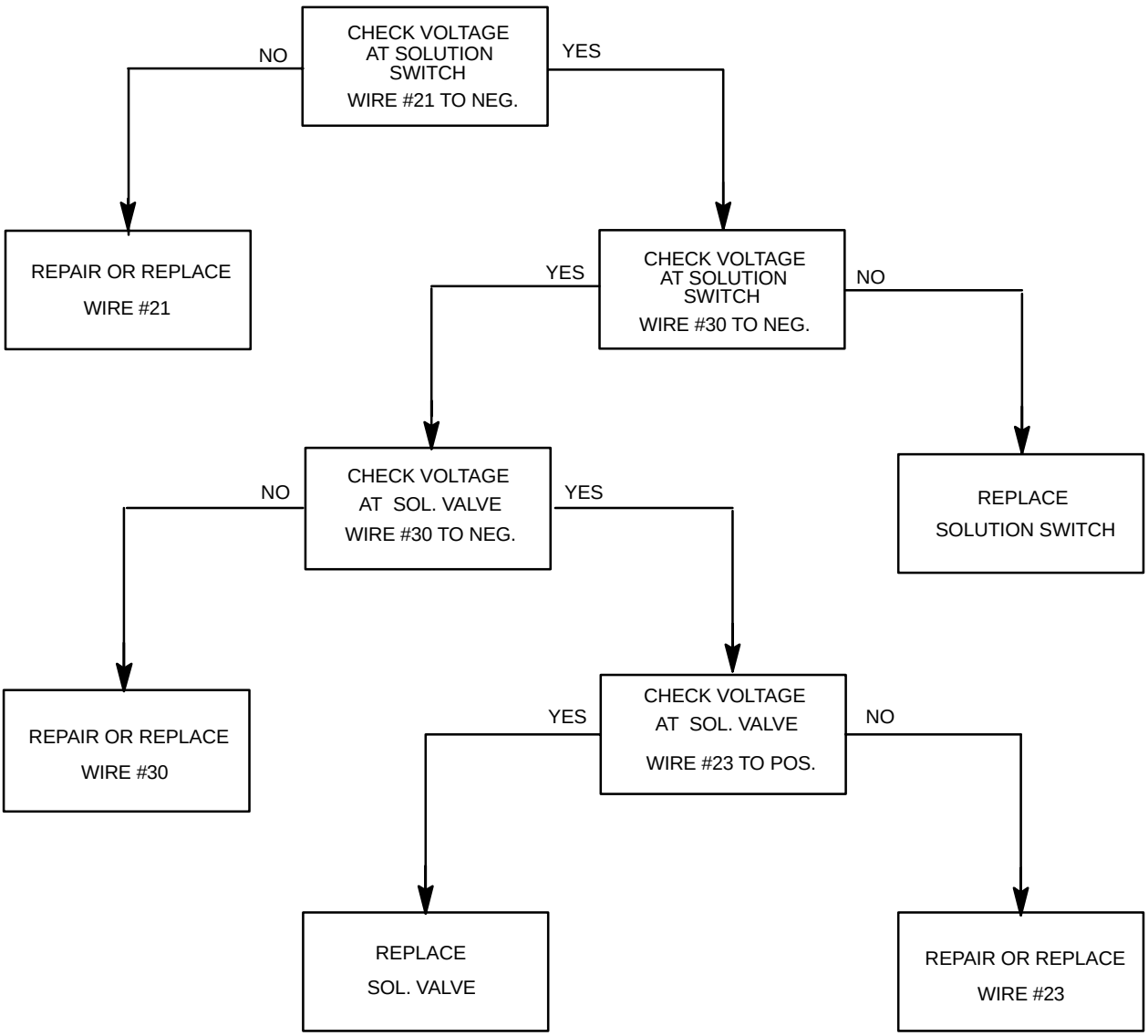



CHECK VOLTAGE AT MAIN BRUSH CONTACTOR WIRE #10 TO NEG.
YES
NO
REPLACE MAIN BRUSH CONTACTOR
CHECK VOLTAGE AT BR. PRESSURE GAUGE WIRE #10 TO NEG.
NO
YES
REPAIR OR REPLACE WIRE #10
CHECK VOLTAGE AT BR. PRESSURE GAUGE WIRE #8 TO NEG.
YES
NO
REPLACE BRUSH PRESSURE GAUGE
CHECK VOLTAGE AT BRUSH C.B. WIRE #8 TO NEG.
NO
YES
REPAIR OR REPLACE WIRE #8
CHECK VOLTAGE AT BRUSH C.B. WIRE #56 TO NEG.
YES
NO
REPAIR OR REPLACE MAIN BRUSH C.B.
CHECK VOLTAGE AT BRUSH MOTOR WIRE #56 TO NEG.
NO
YES
REPAIR OR REPLACE WIRE #56
CHECK VOLTAGE AT BRUSH MOTOR WIRE #57 TO POS.
NO
YES
REPAIR OR REPLACE WIRE #57
REPLACE BRUSH MOTOR

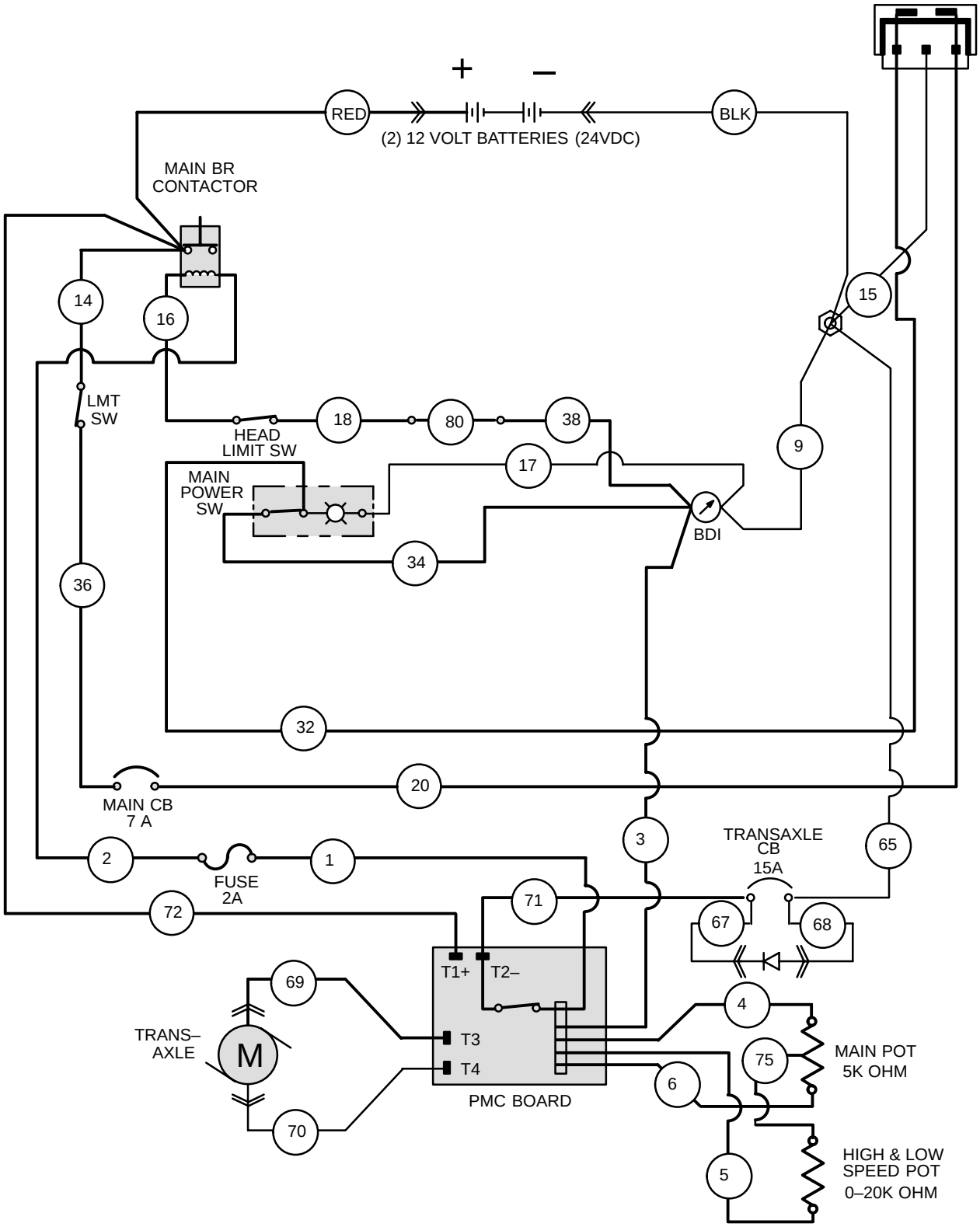
SOLUTION PUMP CIRCUIT



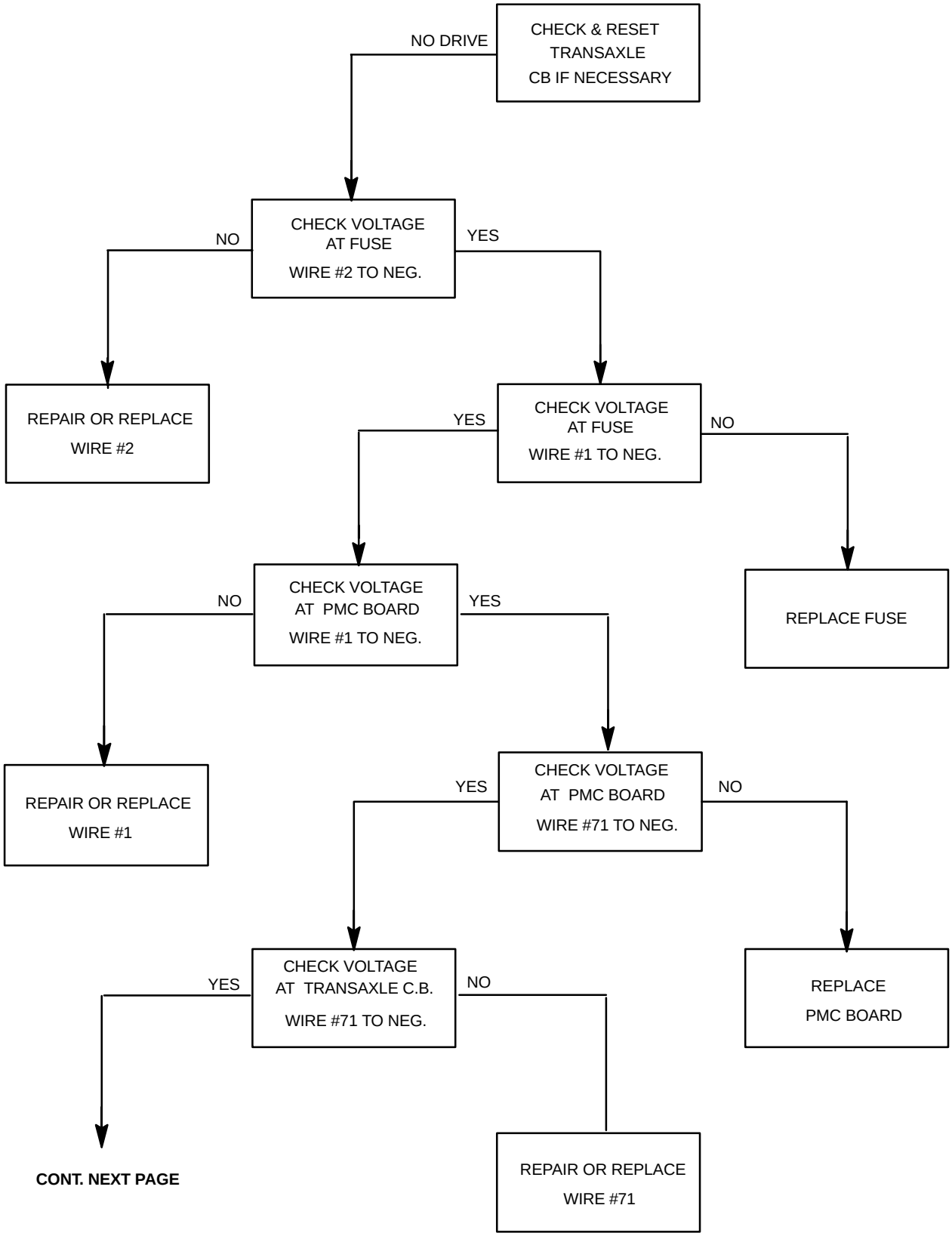
SOLUTION PUMP FAILURE

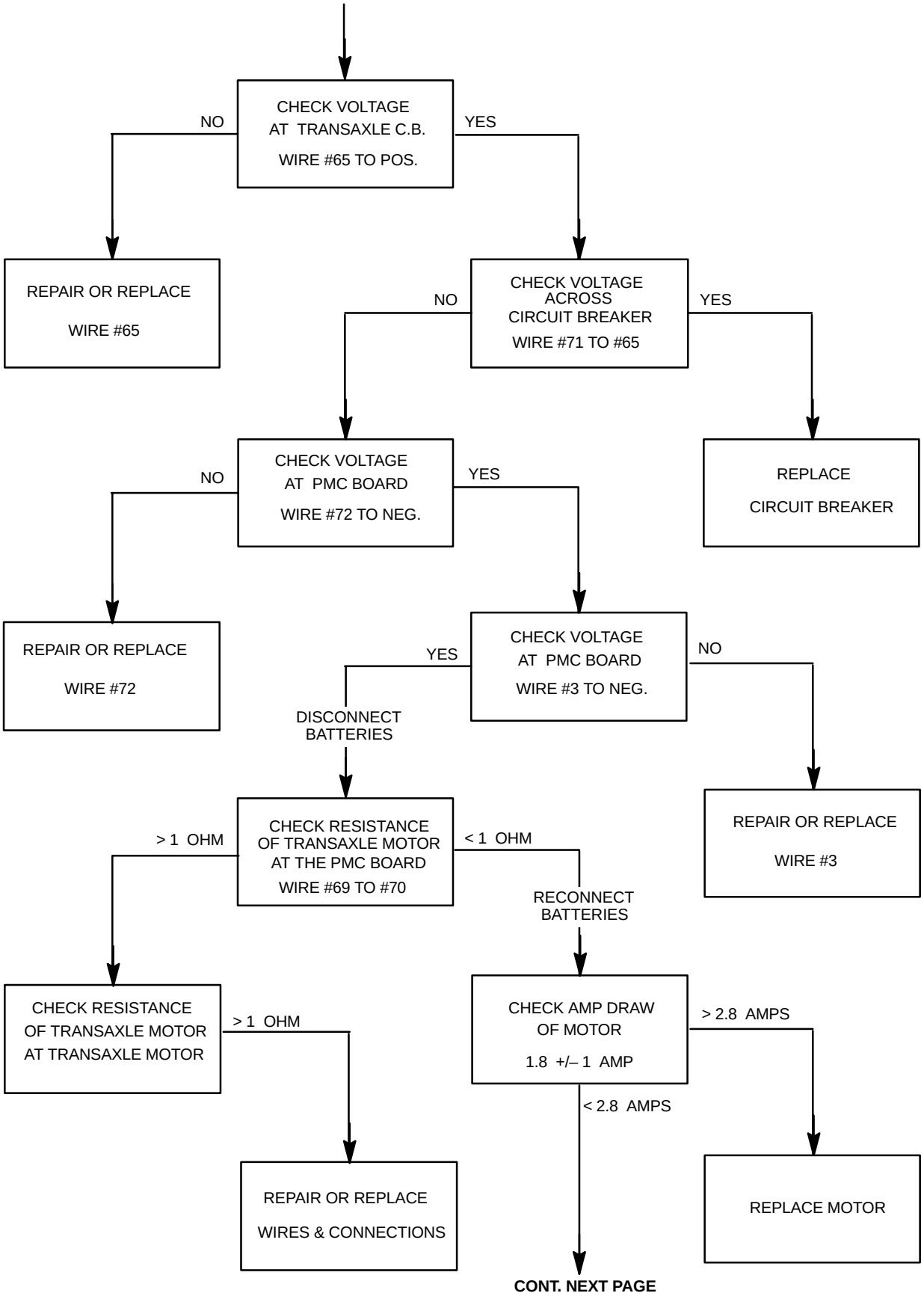


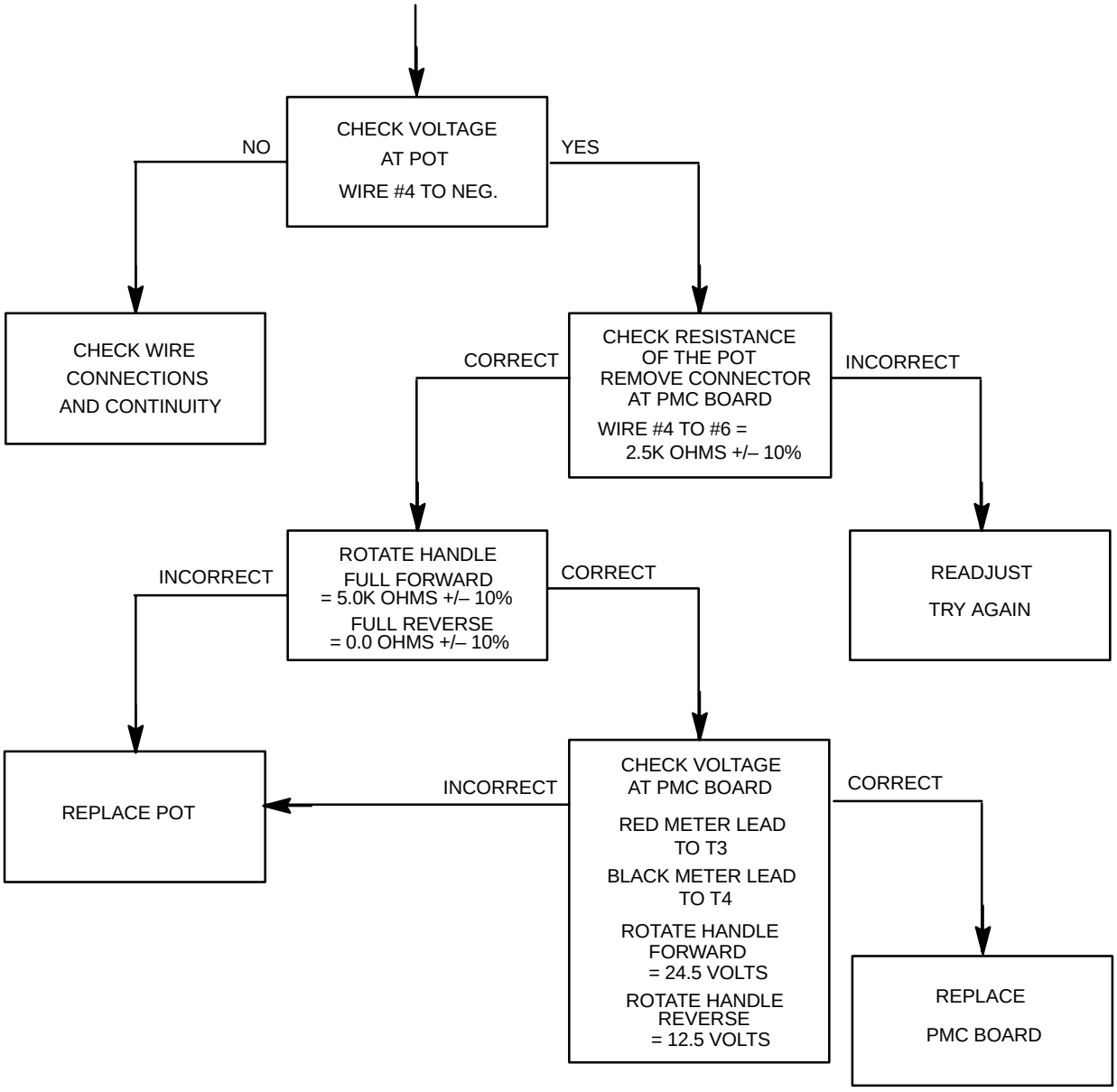
TRACTION DRIVE CIRCUIT



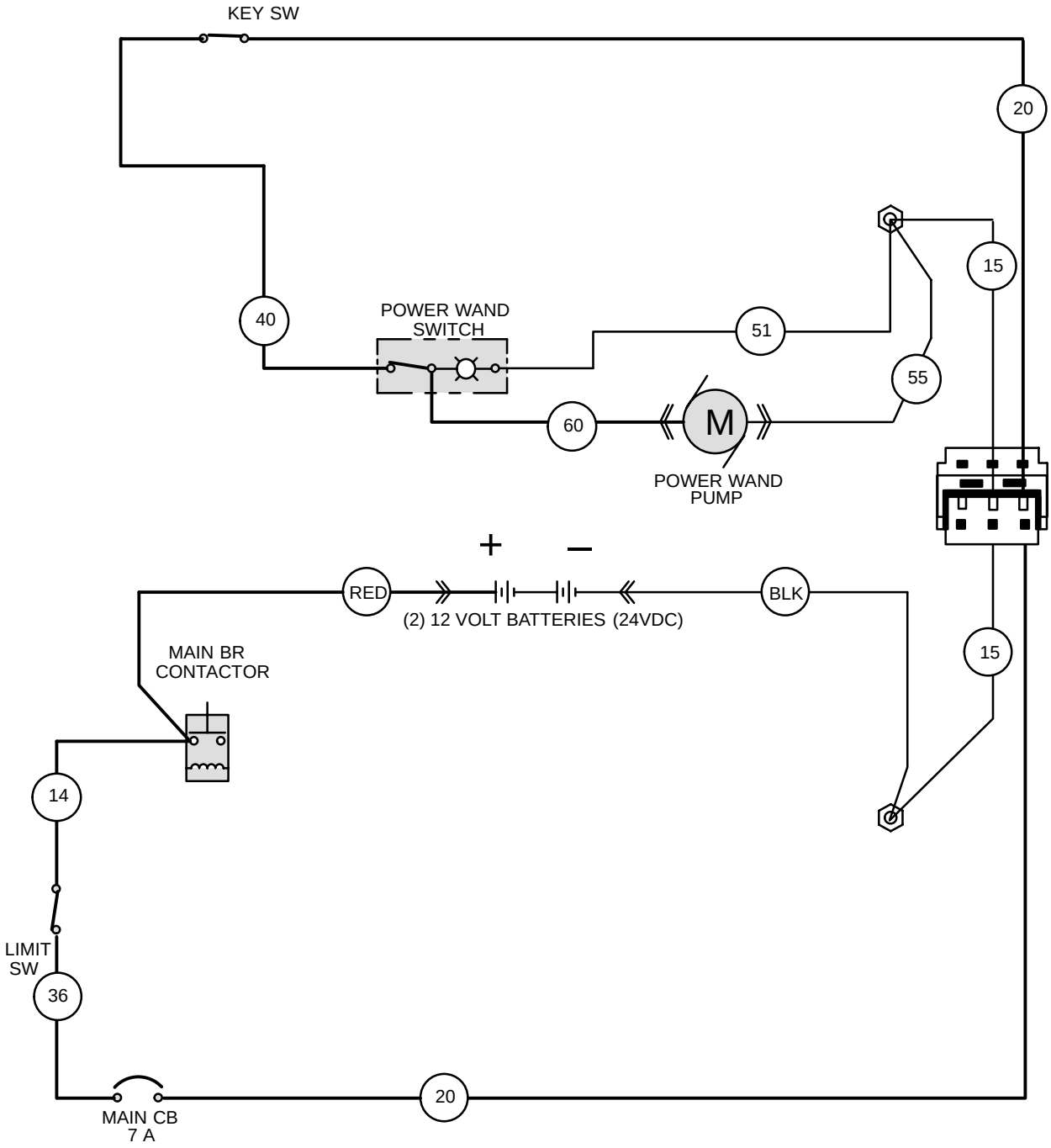
TRACTION DRIVE FAILURE



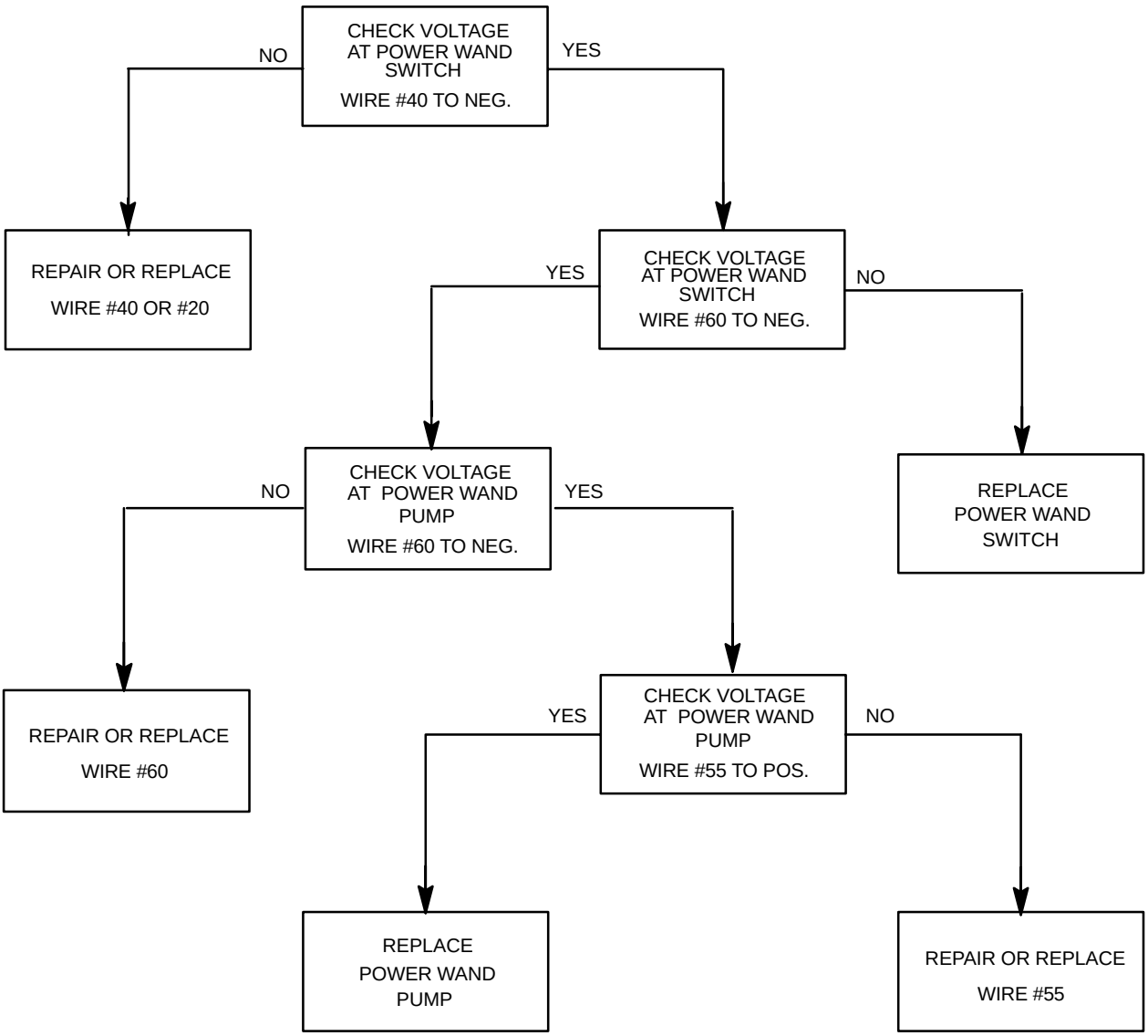

CHECK VOLTAGE
AT TRANSAXLE C.B.
WIRE #65 TO POS.
NO
YES
REPAIR OR REPLACE
WIRE #65
CHECK VOLTAGE
ACROSS
CIRCUIT BREAKER
WIRE #71 TO #65
NO
YES
REPLACE
CIRCUIT BREAKER
CHECK VOLTAGE
AT PMC BOARD
WIRE #72 TO NEG.
NO
YES
REPAIR OR REPLACE
WIRE #72
CHECK VOLTAGE
AT PMC BOARD
WIRE #3 TO NEG.
YES
NO
DISCONNECT
BATTERIES
REPAIR OR REPLACE
WIRE #3
CHECK RESISTANCE
OF TRANSAXLE MOTOR
AT THE PMC BOARD
WIRE #69 TO #70
> 1 OHM
< 1 OHM
RECONNECT
BATTERIES
CHECK RESISTANCE
OF TRANSAXLE MOTOR
AT TRANSAXLE MOTOR
> 1 OHM
CHECK AMP DRAW
OF MOTOR
1.8 +/– 1 AMP
> 2.8 AMPS
< 2.8 AMPS
REPAIR OR REPLACE
WIRES & CONNECTIONS
REPLACE MOTOR
CONT. NEXT PAGE


CHECK VOLTAGE
AT POT
WIRE #4 TO NEG.
NO
YES
CHECK WIRE
CONNECTIONS
AND CONTINUITY
CHECK RESISTANCE
OF THE POT
REMOVE CONNECTOR
AT PMC BOARD
WIRE #4 TO #6 =
2.5K OHMS +/– 10%
CORRECT
INCORRECT
ROTATE HANDLE
FULL FORWARD
= 5.0K OHMS +/– 10%
FULL REVERSE
= 0.0 OHMS +/– 10%
INCORRECT
CORRECT
READJUST
TRY AGAIN
REPLACE POT
CHECK VOLTAGE
AT PMC BOARD
RED METER LEAD
TO T3
BLACK METER LEAD
TO T4
ROTATE HANDLE
FORWARD
= 24.5 VOLTS
ROTATE HANDLE
REVERSE
= 12.5 VOLTS
INCORRECT
CORRECT
REPLACE
PMC BOARD

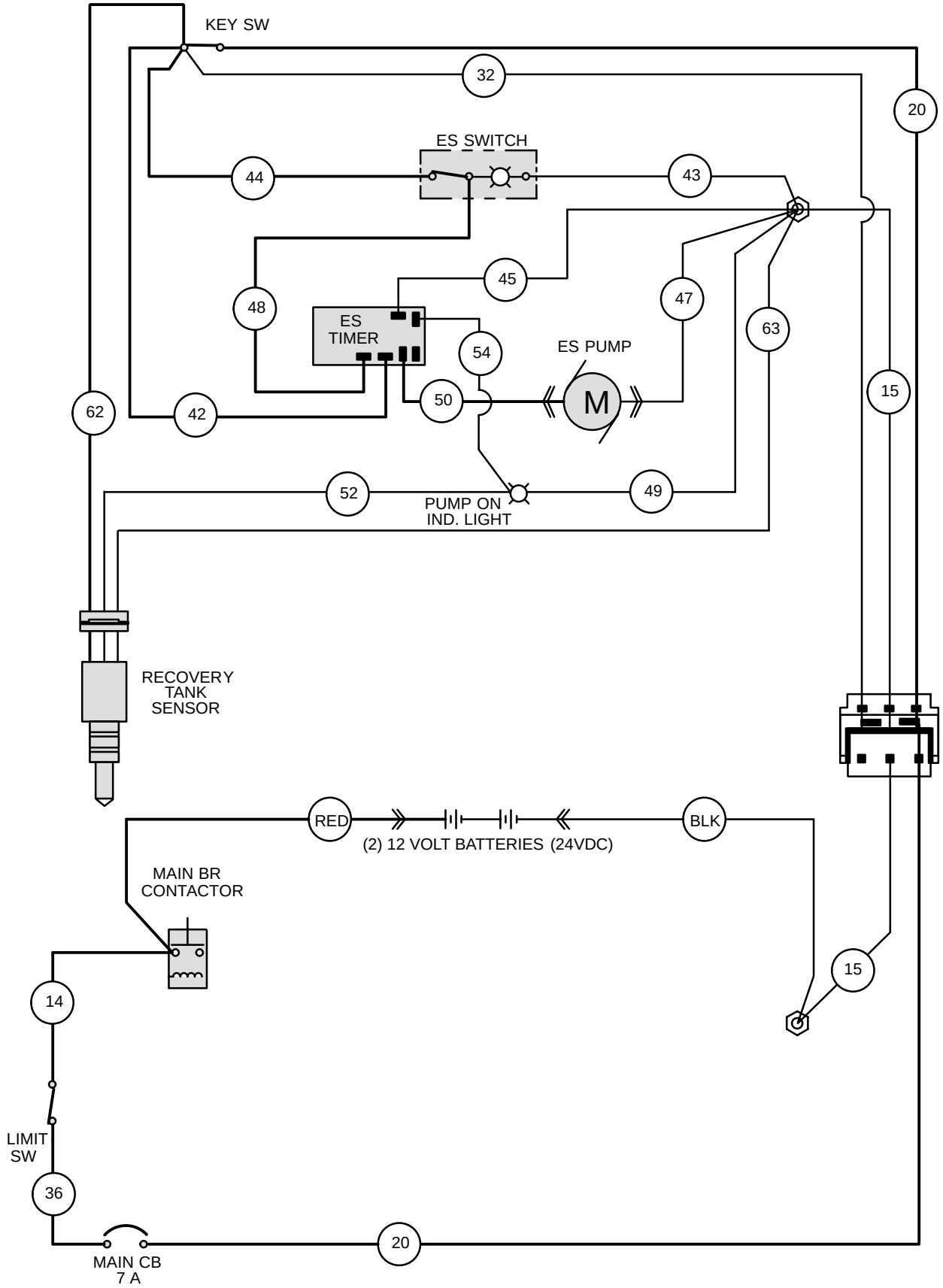
VAC WAND CIRCUIT



POWER WAND FAILURE

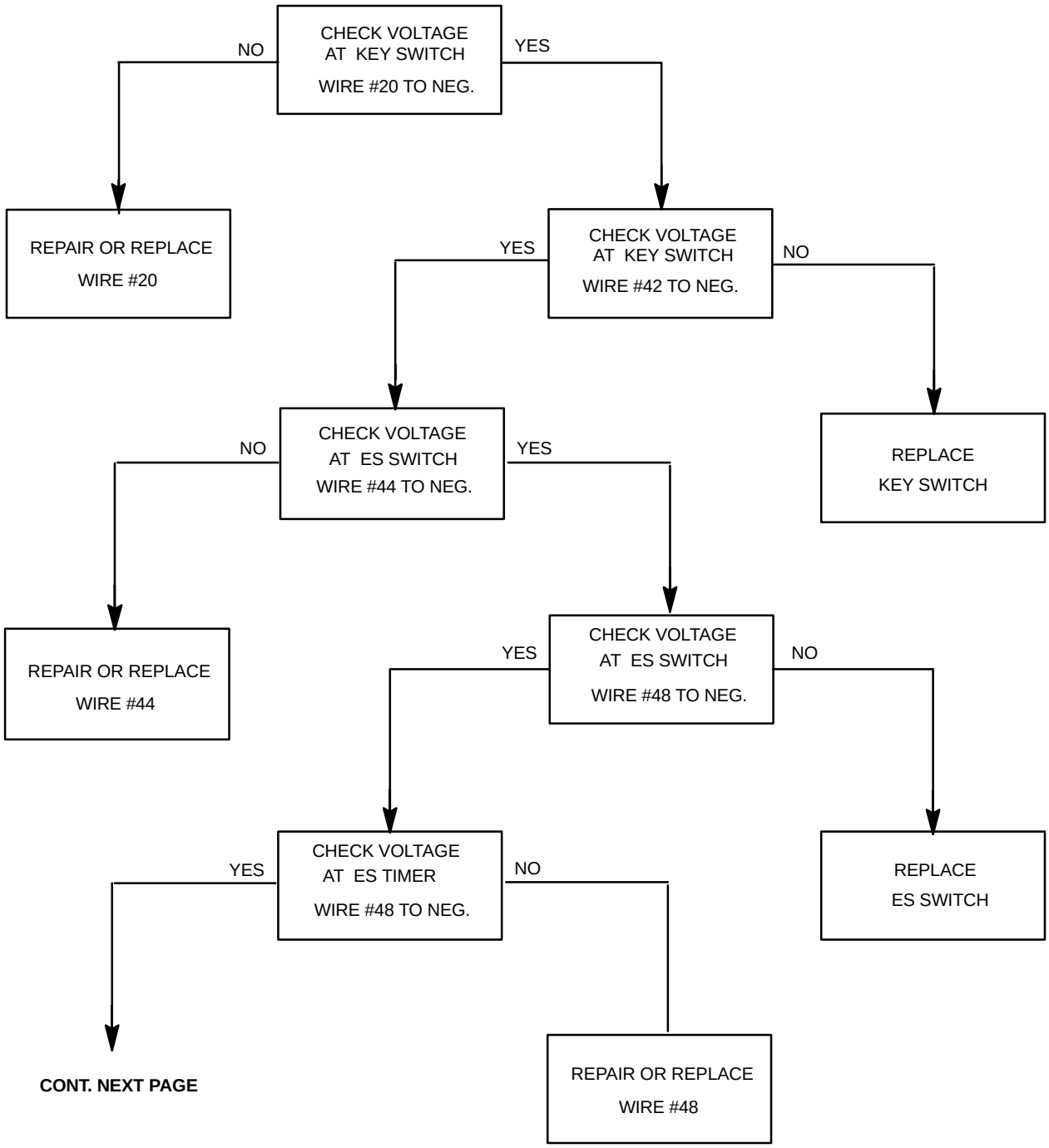

CHECK VOLTAGE AT POWER WAND SWITCH WIRE #40 TO NEG.
NO
YES
REPAIR OR REPLACE WIRE #40 OR #20
CHECK VOLTAGE AT POWER WAND SWITCH WIRE #60 TO NEG.
YES
NO
REPLACE POWER WAND SWITCH
CHECK VOLTAGE AT POWER WAND PUMP WIRE #60 TO NEG.
NO
YES
REPAIR OR REPLACE WIRE #60
CHECK VOLTAGE AT POWER WAND PUMP WIRE #55 TO POS.
YES
NO
REPLACE POWER WAND PUMP
REPAIR OR REPLACE WIRE #55

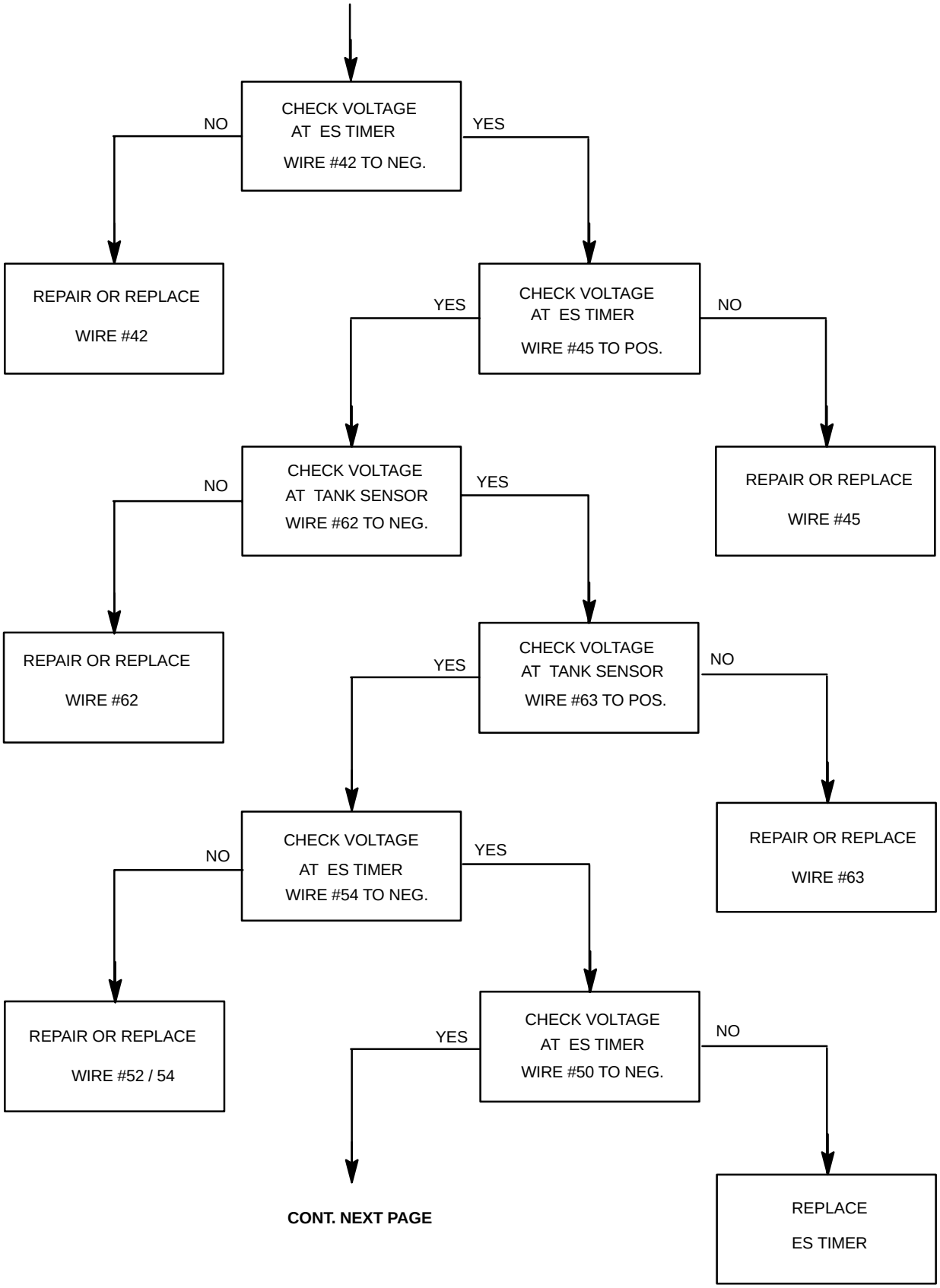
ES PUMP CIRCUIT

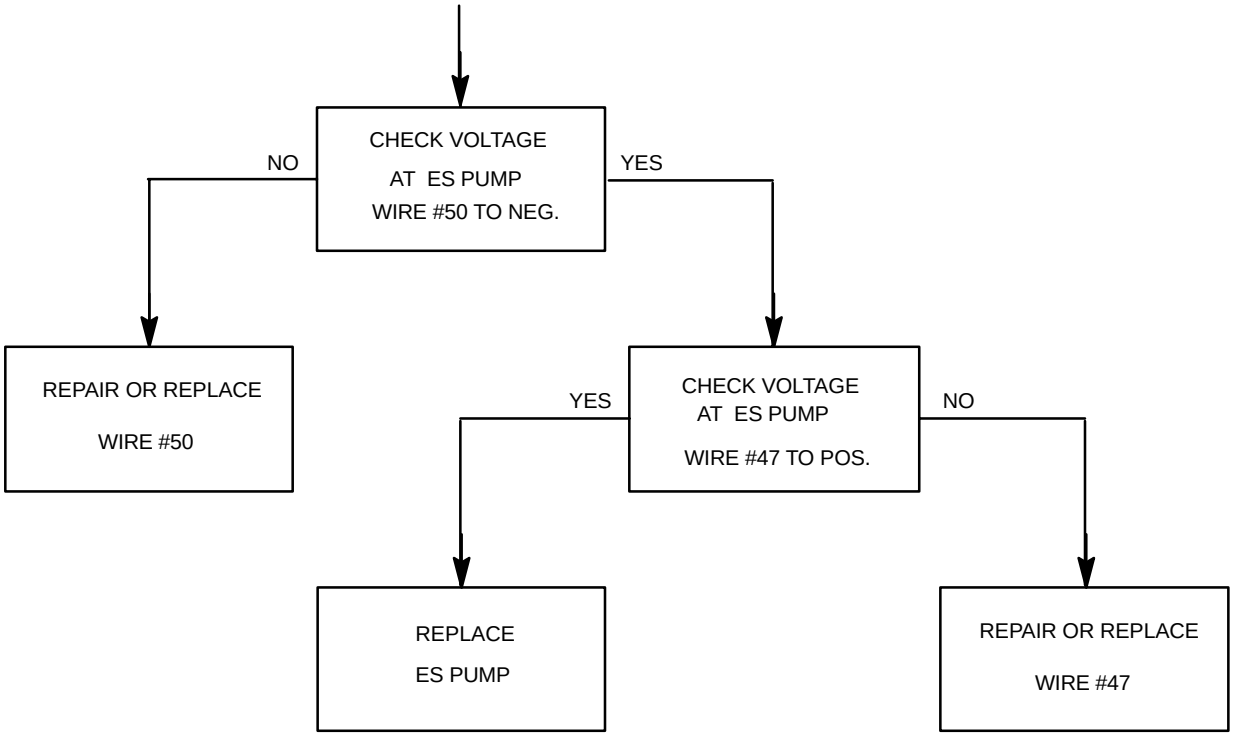


Home Find... Go To..

ES PUMP FAILURE




CHECK VOLTAGE AT ES TIMER WIRE #42 TO NEG.
NO
YES
REPAIR OR REPLACE WIRE #42
CHECK VOLTAGE AT ES TIMER WIRE #45 TO POS.
YES
NO
REPAIR OR REPLACE WIRE #45
CHECK VOLTAGE AT TANK SENSOR WIRE #62 TO NEG.
NO
YES
REPAIR OR REPLACE WIRE #62
CHECK VOLTAGE AT TANK SENSOR WIRE #63 TO POS.
YES
NO
REPAIR OR REPLACE WIRE #63
CHECK VOLTAGE AT ES TIMER WIRE #54 TO NEG.
NO
YES
REPAIR OR REPLACE WIRE #52 / 54
CHECK VOLTAGE AT ES TIMER WIRE #50 TO NEG.
YES
NO
REPLACE ES TIMER
CONT. NEXT PAGE


CHECK VOLTAGE
AT ES PUMP
WIRE #50 TO NEG.
NO
YES
REPAIR OR REPLACE
WIRE #50
CHECK VOLTAGE
AT ES PUMP
WIRE #47 TO POS.
YES
NO
REPLACE
ES PUMP
REPAIR OR REPLACE
WIRE #47

We Need Your Help...

As part of Tennant's Zero Defects Program, we want to know about errors you have found or suggestions you may have regarding our machine manuals. If you find an error or have a suggestion, please complete this postage-paid form and mail it to us. Thank you for helping us make zero defects a way of life at Tennant.

Manual No. _____ Rev. No._____ Publish Date _____ Page _____

Machine _____ ❑ Report Error ❑ Suggestion

_____

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_____

Name _____ Date _____

Customer Number _____

Company _____

Address _____

City/State/Zip Code _____

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Manual No. _____ Rev. No._____ Publish Date _____ Page _____

Machine _____ ❑ Report Error ❑ Suggestion

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_____

Name _____ Date _____

Customer Number _____

Company _____

Address _____

City/State/Zip Code _____